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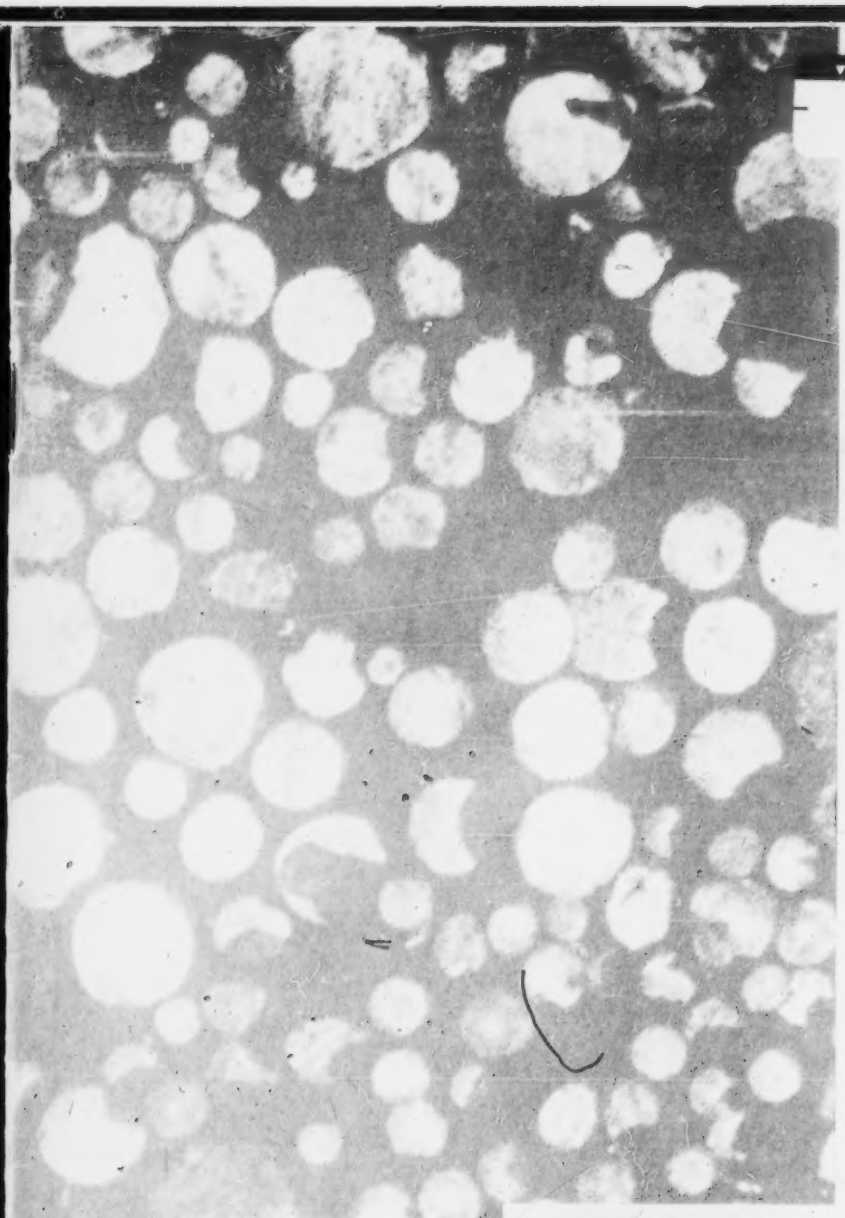

paper paperboard wood pulp capacity

1985-1988 with additional data for 1989

fiber consumption

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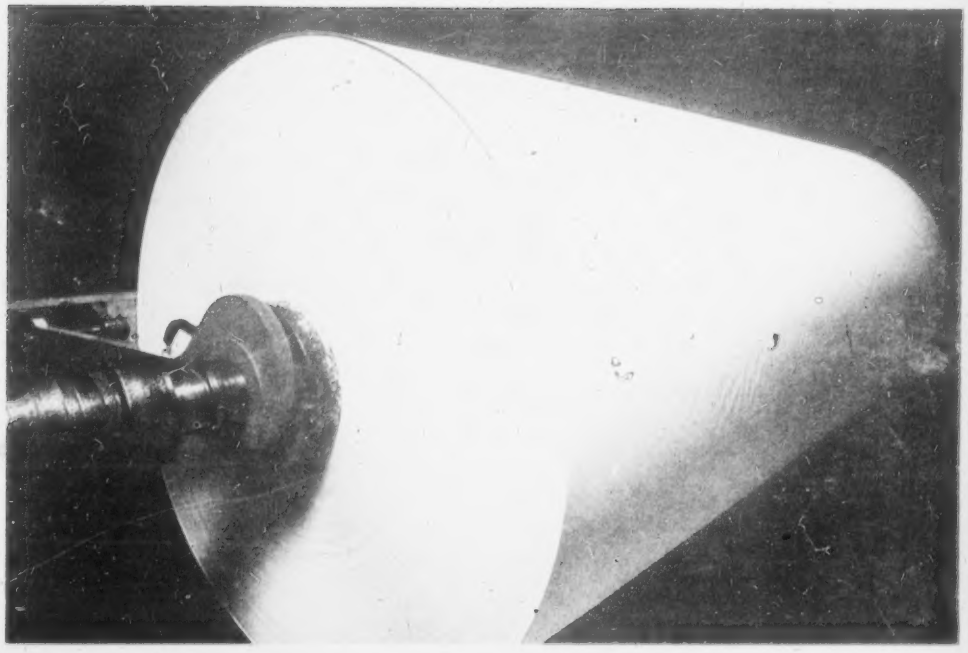
October 1986



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contents

COMMENTARY	3-7
SUMMARY ANNUAL CAPACITIES	8-10
Paper & Paperboard	8
Construction Paper & Board	8
Capacity Reductions	8-9
Wood Pulp	10
Machine Dried Wood Pulp	10
Market Wood Pulp	11
CAPACITY BY GRADE ANNUAL & YEAR END	12-17
Paper	12-13
Paperboard	14-15
Construction Paper & Board	15
Wood Pulp	16-17
ANNUAL CAPACITY REGIONAL DISTRIBUTION	18-19
WORLD CAPACITIES	20-21
Wood Pulp	20
Paper & Paperboard	21
STRUCTURE OF U.S. PAPER INDUSTRY	20-23
Mill Size	20
Integration to Wood Pulp	20-21
Size of Machines—By Grade	22-23
Age of Machines—By Grade	22-23
Age of Machines—By Region	22-23
FIBER FOR PAPER & PAPERBOARD MANUFACTURE	24-25
Wood Pulp-Own Manufacture & Purchased	
Recyclable Paper	
Other Fibers	
PULPWOOD FOR WOOD PULP MANUFACTURE	25
Roundwood	
Manufacturing Residues	
Forest Residues	
RECYCLABLE PAPER CONSUMPTION—END USE	26
ANNOUNCED CAPACITY EXPANSIONS	27
DEFINITIONS & GRADE DESCRIPTIONS	28-29

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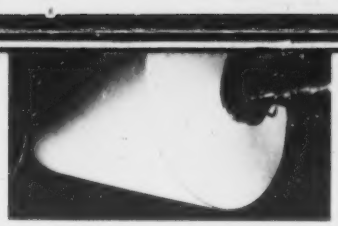


commentary

Capacity plans for the U.S. pulp and paper industry show only small changes in this year's survey from those reported last year. In 1988, capacity for paper and paperboard is expected to be 78,777,000 tons, the same figure reported last year. The build-up in 1986 and 1987, although somewhat slower than in the previous survey, still shows a concentration of additions in the earlier years. The initial plans for capacity in 1989 call for a modest increase of 1.3% in that year, according to responses from reporting companies.

Market conditions and profitability in 1985 and early 1986 remained uncertain for the industry. In addition, various tax reform initiatives which began in 1985 and continued in 1986 could have seriously reduced cash flow and contracted the $8 billion a year spent by the industry on plant and equipment. In mid-1986, it became clear that the industry's sales and profits were performing better than the economy as a whole. This better-than-expected performance could stimulate new capacity plans, but changes will probably be made only after individual companies have had time to analyze the full effects of tax reform on their cash flows and on the economy as a whole.

Manufacturing capacity for finished paper and paperboard is scheduled to increase by 1,317,000 tons, or a full 1.8%, in 1986 to reach a production potential of 75,618,000 annual tons. Capacities for wood pulp are reported to increase by 913,000 tons, or 1.6% reaching a level of 59,554,000 annual tons.*

Plans for future increases in capacity, scheduled for implementation in the three years 1987-1989, show a strong increase in 1987 of 1,765,000 tons, or 2.3%, for paper and paperboard followed by more moderate gains in 1988 and 1989 totalling 2,453,000 tons. For the full three-year-period, capacity for paper and paperboard should increase by 4,218,000 tons and, at a rate of growth averaging 1.8% annually, reach a level of 79,836,000 tons in 1989.

Wood pulp capacity is also expected to show a stronger 795,000 tons gain in 1987, slowing for the two remaining years in the survey, to an annual rate of 0.7%. For the survey period as a whole, 1987-1989, capacity gains for wood pulp will average only 0.9% annually, or less than one-half of the historical average of 2.0% yearly.

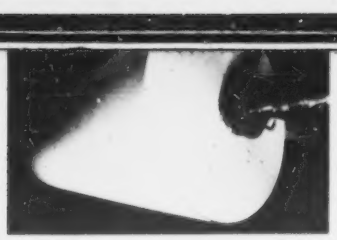
Note: Unless stated otherwise, all references to paper and paperboard and wood pulp exclude construction grades.

*See Table 1 on page 4.

The American Paper Institute has conducted annual capacity surveys in the primary pulp and paper industry for almost thirty years. Over time, the scope of the surveys has expanded significantly and this year includes responses from producers of more than 90% of total U.S. paper, paperboard and wood pulp.

The outline below is intended to clarify definitions and methodology and to assist the user in utilizing the capacity and raw materials data in the survey report.

- Capacity projects included in the survey are firm commitments. Such projects will usually be approved by senior management or boards of directors, have assured financing and, in many instances, will include site acquisition and signed contracts for machines or equipment.
- Published capacities for paper and paperboard represent potential for *primary finished production* before conversion into end products. Capacities for wood pulp are measured at a 10% moisture content. Consumption of pulp wood, recyclable paper and other fiber are "as received at mill".
- The definition of practical maximum capacity assumes normal operating conditions, full demand, adequate supplies of raw materials and available labor. The concept assumes that machines operate on an "all out" basis on their customary grade mix.
- Daily capacities are extrapolated to annual totals based on the maximum number of days each machine can operate in one year. Downtime, scheduled before the start of the year, other than due to lack of orders is excluded from capacity. Unscheduled downtime, is included.
  (Maximum operating days reported on pages 12 through 17 of this survey represent weighted averages of all machines in the industry).
- Capacity changes include the effect of new machine installations, rebuilds, shutdowns, revised operating schedules, grade and basis weight changes or other modifications to existing facilities. Changes also include grade reallocations on "swing" machines which reflect intermediate or long range market strategies and not short-term adjustments to market conditions which are often revised on a monthly basis.
- Capacities of "swing" or multiproduct machines are distributed on the basis of actual grade mix. For example, a swing machine in one year may be capable of producing 100,000 tons of unbleached kraft linerboard, if run exclusively on board, or 80,000 tons of unbleached kraft paper, if run exclusively on paper. If, in fact, the machine produces board for 75% of its operating year and paper for 25%, its capacity would be published as 75,000 tons of linerboard and 20,000 tons of paper. Planned changes in grade allocations (swings) in future years would be calculated in the same way.
- Capacities of dismantled or permanently inactive machines are removed from estimates immediately on shutdown. Capacities of other idled machines are removed after one year unless resumed operation is in prospect.
- Capacities of individual mills are directly related to verified levels of production.
- Edit procedures establish that types and quantities of fiber consumed in each mill are consistent with verified annual production.
- Inconsistencies in reported data are reconciled by direct contacts with company executives.
- Published capacities are grade totals summarized to regional and industry levels. Specific establishment data are not disclosed in the survey unless publicly announced by the respective companies.



commentary

Although lead times for incremental wood pulp expansions are short, and could be brought into production rather quickly, our survey shows that utilization of recyclable paper will increase over the next several years.

Market pulp capacity, reflecting increased integration to papermaking, was reduced 185,000 tons in 1986 to 7,804,000 tons. Through 1989, producers report that modest capacity additions will continue to be offset by the diversion of pulp to support new paper and paperboard expansions, and capacity for market pulp is not expected to increase beyond 7,852,000 tons in that year.

As table I shows, printing and writing and tissue grades will grow at strong average annual rates of 3.5% and 2.4% respectively through 1989, and will account for virtually all of the planned increase in paper capacity. Capacity in packaging and industrial grades continues the declines experienced in recent years. Unbleached kraft paperboard, used mostly for corrugated shipping containers, and recycled paperboard, with expected average annual growth rates of 1.6% and 1.3% respectively, will provide most of the planned expansion in paperboard, although solid bleached and semichemical paperboard capacity is expected to gain 0.8% a year.

Overall, paper capacity with additions totalling 2,756,000 in the 1987-1989 years, will account for 65% of all new capacity.

Expansion of 1,324,000 tons in sulfate and soda paper grade pulp capacity averaging 1.0% annually and thermomechanical pulp expansions, totalling 380,000 annual tons, will be the major factors in the 2.7% annual growth rate estimated for mechanical pulps.

TABLE 1:
GROWTH TRENDS IN CAPACITY

Thousands short tons

GRADES	ADDITIONS 1977-1986		ADDITIONS 1987-1989	
	10 YEAR INCREASE	AVERAGE ANNUAL GROWTH	3 YEAR INCREASE	AVERAGE ANNUAL GROWTH
TOTAL ALL GRADES PAPER & PAPERBOARD	**12,110**	**1.7%**	**4,218**	**1.8%**
TOTAL PAPER & PAPERBOARD	**14,311**	**2.1**	**4,218**	**1.8**
TOTAL PAPER	**8,892**	**2.7**	**2,756**	**2.4**
NEWSPRINT	1,845	3.8	109	0.6
PRINTING & WRITING	6,469	3.8	2,307	3.5
PACKAGING & IND. CONV.	(429)	(0.7)	(63)	(0.4)
TISSUE	1,008	2.0	402	2.4
TOTAL PAPERBOARD	**5,419**	**1.6**	**1,462**	**1.3**
UNBLEACHED KRAFT	3,934	2.4	881	1.6
SOLID BLEACHED	540	1.3	104	0.8
SEMICHEMICAL	770	1.5	126	0.8
RECYCLED	174	0.2	351	1.3
CONSTRUCTION GRADES	**(2,200)**	**(6.7)**	—	—
TOTAL ALL GRADES WOOD PULP	**9,960**	**1.8%**	**1,643**	**0.9%**
TOTAL WOOD PULP (excluding pulp for Construction Paper & Board)	**10,795**	**2.0**	**1,659**	**0.9**
DISSOLVING & SPECIAL ALPHA	(127)	(0.8)		
SULFITE	(712)	(3.4)	(114)	(2.3)
SULFATE & SODA*	9,758	2.4	1,324	1.0
SEMICHEMICAL	223	0.5	(47)	(0.3)
MECHANICAL	1,653	3.2	496	2.7
WOOD PULP FOR CONSTRUCTION PAPER & BOARD	**(835)**	**(6.1)**	**(16)**	**(0.6)**

*Includes screenings

Not adjusted for rounding differences

Continuity

A comparison of present capacity estimates for 1988, with projections published in our survey last year, shows very little change in overall plans as illustrated in the following table.

ESTIMATED ANNUAL CAPACITY IN 1988

Thousands short tons

	Last Year	This Year	Change
PAPER	40,069	40,140	+71
PAPERBOARD	38,699	38,637	−62
WOOD PULP	60,733	60,844	+111
MARKET PULP	7,824	7,826	+2

On an individual product grade basis, however, and for specific time periods, producers have made more significant adjustments in capacity in line with changes in market conditions. While these changes are described in more detail elsewhere in this commentary, some examples are cited below:

Uncoated Free Sheet Papers
- postponed plan to convert pulp dryer to produce 100,000 annual tons of uncoated free sheet in 1986.
- shutdown of machines, capacity reduction of 100,000 annual tons.

Coated and Uncoated Groundwood Papers
- delayed capacity expansion.
- shutdown of machines, capacity reduction of 200,000 tons.

Solid Bleached Paperboard
- delay in expansion project.
- growth estimates revised by producers.

Recycled Paperboard
- reclassification of 175,000 tons of capacity from "container chip" to "other recycled paperboard".

Semichemical Wood Pulp
- shutdown mills, capacity reduction of 160,000 annual tons.

*Regional Capacity**

The regional distribution of capacity in table 4 shows that one half of all paper and paperboard capacity and more than 70% of all wood pulp capacity in 1985 is concentrated in the southern U.S. Over the four-year-period 1986-1989, this region will increase share and will account for 68% of all new growth in paper and paperboard capacity. Printing and writing grades in the south, with a 31% share of total U.S. capacity in 1985, will account for 62% of

*See Table 4 on page 6.

all new printing and writing capacity while tissue grades with a 28% share in 1985 will provide 71% of all new capacity for these papers in this region.

The central region, with 20% of 1985 paper and paperboard capacity, will maintain its share over the 1986-1989 period while making some gain in share of wood pulp capacity. The northeastern and western regions will provide smaller shares of new paper, paperboard and wood pulp capacity than their respective shares in 1985.

Raw Materials[†]

Mirroring a cutback in paper and paperboard production in 1985, consumption of fibrous raw materials as furnish for papermaking declined from 72,421,000 tons in 1984 to 70,153,000 tons in 1985. A sharp pickup in production in 1986 is bringing fiber consumption to an expected 74,297,000 tons this year with an 8.4% or 6,236,000 ton increase expected by 1989 if the industry operates at capacity in that year.

Consumption of secondary fibers, including wood pulp produced from manufacturing and forest residues, recyclable paper, cotton linters and other waste, totaled 38,328,000 tons in 1985 and constituted 54.6% of all fibers consumed. Although the overall relationship between primary and secondary fibers is not expected to change in the 1986-1989 years, producers plan to increase their utilization of recyclable paper from 23.6% to 24.4% of total fiber, while wood pulp from secondary fibers will decline from 30.6% to 29.9% of total furnish.

PAPER AND PAPERBOARD

Newsprint

U.S. newsprint capacity, at 5,859,000 tons in 1986, has increased by only 85,000 tons, or 1.5%, since 1983. During this period, no new machines were brought into production and capacity gains from improvements to existing plant have been largely offset by the shutdown or conversion of about 300,000 tons of capacity to other grades. This relatively static condition is reported to hold through 1989 with miscellaneous improvements expected to yield only 109,000 tons of new capacity. As previously reported, two newsprint mills are under consideration one in Washington and one in California and these projects, together with possible new machine installations in existing mills, could provide a basis for future U.S. expansion.

The most recent survey by the Canadian Pulp and Paper Association reports newsprint expansion in Canadian mills totalling 176,000 tons over the next two years. If these gains are realized, North American newsprint capacity would increase from 16,926,000 tons in 1986 to 17,199,000 tons in 1988.

[†]See Table 5 on page 6.

Printing and Writing Papers

In the three-year-period 1984-1986 five new uncoated free sheet paper machines were brought into operation in U.S. paper mills. In addition, a large unbleached kraft paper machine, equivalent in capacity to a modern printing/writing paper machine, was converted to the production of uncoated free sheet papers. These major projects have helped to increase capacity for uncoated free sheet papers by a dramatic 17% or 1,601,000 tons—from 9,354,000 tons in 1983 to 10,955,000 tons in 1986.

No new machines have been announced for the three future years covered in this survey, but the conversion of another 250,000 ton unbleached kraft paper machine, together with other scheduled expansions, is expected to bring the capac-

TABLE 2:
COMPARISON OF CAPACITY ESTIMATES FOR TOTAL PAPER & PAPERBOARD

Thousands short tons

SURVEY PUBLISHED IN:	ESTIMATES						
	1982	1983	1984	1985	1986	1987	1988
1980	70,406	71,565					
1981	70,355	71,833	72,964				
1982	70,197	71,155	72,455	73,806			
1983	70,086*	70,814	71,965	73,054	74,084		
1984		71,126*	72,749	73,700	74,973	76,317	
1985			73,098*	74,304	75,803	77,708	78,768
1986				74,301*	75,618	77,383	78,777
WIDEST DEVIATION FROM ACTUAL ▸	0.5%	1.0%	1.6%	1.7%			
WIDEST RANGE ▸					2.3%	1.8%	0.0%

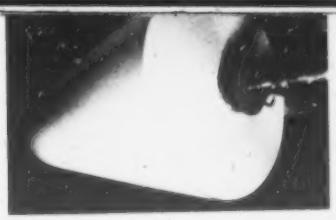
*Actual

TABLE 3:
ANNUAL CAPACITIES 1970-1989

Thousands short tons

YEAR	ANNUAL CAPACITY		CAPACITY ADDITIONS DURING YEAR		PERCENT INCREASE	
	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES	PAPER & PAPERBOARD	ALL GRADES
1970	53,260	57,195	1,140	1,221	2.2%	2.2%
1971	54,136	58,141	876	946	1.6	1.7
1972	55,873	59,965	1,671	1,824	3.1	3.1
1973	58,164	62,284	2,291	2,319	4.1	3.9
1974	59,527	63,779	1,363	1,495	2.3	2.4
1975	60,140	64,369	613	590	1.0	0.9
1976	61,307	65,673	1,167	1,304	1.9	2.0
1977	62,004	66,459	697	786	1.1	1.2
1978	63,091	67,419	1,087	960	1.8	1.4
1979	64,615	69,033	1,524	1,614	2.4	2.4
1980	66,368	70,716	1,753	1,683	2.7	2.4
1981	68,172	72,255	1,804	1,539	2.7	2.2
1982	70,086	73,118	1,914	863	2.8	1.2
1983	71,126	74,017	1,040	899	1.5	1.2
1984	73,098	75,943	1,972	1,926	2.8	2.6
1985	74,301	76,622	1,203	679	1.6	0.9
1986E	75,618	77,833	1,317	1,211	1.8	1.6
1987E	77,383	79,593	1,765	1,760	2.3	2.3
1988E	78,777	80,991	1,394	1,398	1.8	1.8
1989E	79,836	82,051	1,059	1,060	1.3	1.3

E—Estimate



commentary

ity-level for these papers to 11,739,000 tons in 1989.

Substantial growth in capacity is also planned for coated free sheet and coated groundwood papers, with projected growth of 6.3% and 5.9% respectively during the years 1987-1989. Uncoated groundwood capacity estimated at 1,621,000 tons in 1986 is expected to increase to 1,776,000 tons in 1989.

Kraft Packaging Papers

Closures and conversions of machines to the manufacture of other grades of paper have reduced total capacity for unbleached kraft packaging paper by 525,000 tons in the ten-year-period 1975-1985. This pattern, which reflects shrinking markets and competition from substitutable packaging materials, will continue in 1986 with the conversion to white paper production of a 250,000 ton-per-year machine in a southern mill. No significant reductions are reported for the remaining three years covered by this survey and capacity is estimated at 3,520,000 tons in 1989.

Tissue Papers

Building on a strong 3% increase in 1986, producers plan to add 402,000 tons of new capacity for tissue papers in the three years 1987-1989. These additions to capacity, which will yield a 2.4% annual average rate of increase, will exceed the 2.0% annual average over the previous ten years. In recent years, most additions to tissue capacity have resulted from the installation of new machines in existing mills. In last year's survey, these projects comprised 97% of all planned expansions. It is interesting to note that this pattern has changed in this survey, and more than one half of all projected increases in the next three years will be achieved from machine rebuilds and modernization of existing plant.

Unbleached Kraft Paperboard

Committed additions of capacity for unbleached kraft linerboard total 732,000 tons over the next three years and capacity in place should increase from 17,078,000 tons in 1986 to 17,810,000 tons in 1989. No significant new expansion projects or new machines are reported during this period and both the expected rate of growth and the yearly capacity totals are almost identical to estimates reported in our survey last year. The last U.S. greenfield kraft linerboard mill came on line in 1981 and since that time all increases in manufacturing capacity have been achieved from expansions in existing mills.

TABLE 4:
REGIONAL DISTRIBUTION--CAPACITY & CHANGES

	NORTHEAST		CENTRAL		SOUTH		WEST	
GRADES	SHARE OF U.S. CAPACITY 1985	SHARE OF U.S. CAPACITY CHANGES 1986-1989*	SHARE OF U.S. CAPACITY 1985	SHARE OF U.S. CAPACITY CHANGES 1986-1989*	SHARE OF U.S. CAPACITY 1985	SHARE OF U.S. CAPACITY CHANGES 1986-1989*	SHARE OF U.S. CAPACITY 1985	SHARE OF U.S. CAPACITY CHANGES 1986-1989*
PAPER & PAPERBOARD TOTAL†	16.1%	6.9%	19.9%	19.4%	50.7%	67.8%	13.3%	5.9%
PRINTING & WRITING	30.7	8.6	29.1	27.7	31.4	61.6	8.8	2.1
TISSUE	29.1	15.4	25.8	15.0	28.4	70.6	16.7	(1.0)
UNBL. KRAFT PAPERBOARD					83.2	86.8	16.8	13.2
SOLID BLEACHED PAPERBOARD	0.7	(1.1)			88.4	96.3	10.9	4.8
SEMICHEMICAL PAPERBOARD	1.9	0.4	32.3	83.2	51.8	54.9	14.0	(38.5)
RECYCLED PAPERBOARD	24.1	12.3	38.4	5.4	22.6	43.8	14.9	38.5
WOOD PULP TOTAL†	7.4%	2.3%	4.4%	21.7%	72.5%	71.3%	15.7%	4.7%
SULFATE & SODA	5.6	1.9	3.5	16.4	76.2	73.9	14.7	7.8
MECHANICAL	20.4	3.5	11.3	41.1	45.2	61.9	23.1	(6.5)

*Percent change in four year period
†Total of grades shown

TABLE 5:
FIBER SOURCES FOR PAPER & PAPERBOARD MANUFACTURE

Thousands short tons

	1985		1986	1987	1988	1989	
GRADES	ANNUAL TONS	PERCENT	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	ANNUAL TONS	PERCENT
TOTAL CONSUMPTION	**70,153**	**100.0%**	**74,297**	**77,309**	**79,510**	**80,533**	**100.0%**
PRIMARY FIBERS	**31,825**	**45.4**	**33,987**	**35,129**	**36,071**	**36,461**	**45.3**
WOOD PULP	31,825	45.4	33,987	35,129	36,071	36,461	45.3
SECONDARY FIBERS	**38,328**	**54.6**	**40,310**	**42,180**	**43,439**	**44,072**	**54.7**
WOOD PULP	21,483	30.6	22,216	23,175	23,779	24,106	29.9
RECYCLABLE PAPER*	16,550	23.6	17,796	18,683	19,311	19,611	24.4
OTHER	295	0.4	298	322	349	355	0.4

Note: Consumption for 1987-1989 assumes capacity levels of production

Includes the following tonnage consumed in the manufacture of molded pulp products: 1985, 179,000 tons; 1986, 191,000 tons; 1987-1989, 202,000 tons

Solid Bleached Paperboard

With the successful startup in 1986 of a new machine which replaced existing capacity at the same mill, no further large scale projects are reported during this survey. Capacity levels for solid bleached paperboard have been revised downward from the estimates reported in our survey last year. Producers now report capacity available in 1986 at 4,538,000 tons, or 126,000 tons under their previous estimate of 4,664,000 tons. Over the next three years, net planned additions of 104,000 annual tons, or about 0.8% a year, should bring capacity totals in 1989 to 4,642,000 tons.

As a "swing" grade, capacity allocated to solid bleached paperboard can, when market conditions indicate, be diverted to or from the production of bleached market pulp or in some instances bleached bristols. This swing potential makes it useful to review capacity changes for all three bleached grades combined.

Semichemical Paperboard

At a rate of growth averaging 0.8% annually, capacity for the manufacture of semichemical corrugating is estimated to increase modestly from 5,528,000 tons in 1986 to 5,654,000 tons in 1989. No new machines or large scale expansion projects are reported for the next three years and the effect of other miscellaneous expansions are partially offset by the planned conversion of a 100,000 ton-per-year machine to kraft linerboard production. This project is targeted for 1987. In addition, a mill with 90,000 tons of capacity, idled in late 1985, has been retained in our estimates pending clarification of its future status.

Both semichemical and recycled corrugating are components of containerboard and, as shown below, capacity of the major containerboard products are in relative balance.

Recycled Paperboard

After adjusting for the removal of 65,000 tons of idled facilities from our estimates for 1985 and 1986, total recycled paperboard capacity shows no material change from estimates reported in last year's survey. A new linerboard mill in California was brought on stream in 1985, and a conversion of a kraft linerboard machine to recycled corrugating production, is in prospect for 1987, although delayed by several months.

In a consensus decision, producers have authorized the reclassification of partition board from the "container chip and filler" category to "other recycled paperboard". This reclassification, involving almost 175,000 annual tons, is reflected in our capacity estimates for 1985 and should harmonize future production and capacity statistics.

Thousands short tons	Annual Capacity 1986	1989	3 year increase
SEMICHEMICAL CORRUGATING	5,528	5,654	2.3%
RECYCLED CORRUGATING	1,541	1,723	11.8%
TOTAL	7,069	7,377	4.4%
UNBLEACHED KRAFT LINERBOARD	17,078	17,810	4.3%

WOOD PULP GRADES

Dissolving Pulps

Reductions in annual capacity of 33,000 tons in 1985 and 10,000 tons in 1986, anticipated in our survey estimates last year, bring total capacity for dissolving and special alpha pulps to 1,444,000 tons in 1986. No change in this level is expected in the 1987-1989 years.

Although the end uses of dissolving pulps are largely outside the paper industry, the mills can also produce lower cellulose content paper grade pulps. As market conditions change, adjustments in production quotas between paper and dissolving grades causes fluctuations in reported capacities. Over recent years, capacity for dissolving pulps has remained relatively unchanged.

Sulfite Pulps

This year's capacity estimates show resumption of a long-term decline in wood pulp manufacture using the sulfite process which had stablized in 1982. A facility idled in 1986, together with the announced shutdown of a major mill in the north central U.S. in 1987, will contribute to net reductions in sulfite pulp capacity of 33,000 annual tons in 1986 and an additional 114,000 annual tons by 1989. Overall capacity for these pulps should decline from 1,738,000 tons in 1985 to 1,591,000 tons in 1989 with only 15 sulfite mills remaining in operation at that time.

Sulfate and Soda Paper Grade Pulps

Planned increases in capacity for sulfate and soda paper grade pulps from 1987 to 1989 total 1,324,000 tons, mostly in bleached grades. Compared with recent trends, this increase represents a low rate of growth averaging 1.0% annually over the next three years. For the previous ten years the annual rate of increase had averaged 2.4%.

Despite an apparent oncoming period of reduced growth, sulfate pulps continue to increase their already dominant share of total paper grade wood pulp capacity. From a 73% share of the total in 1975, sulfate pulps increased their share to 76.4% in 1985 and are expected to reach 76.8% in 1989.

Mechanical Pulps

Strong capacity growth planned for thermomechanical pulps in the 1987-1989 period should increase capacity by 14%, from 2,639,000 tons in 1986, to 3,019,000 tons in 1989. At this level capacity for these high yield pulps, first introduced into U.S. mills in 1975, will exceed capacity for stone groundwood pulp the long time mainstay of newsprint and groundwood paper manufacture.

Sizable production increases in refiner groundwood pulp are also expected over the next three years with planned additions to capacity totaling 134,000 tons, or a full 33% increase, over capacity in place in 1986.

Market Paper Grade Pulp

Capacity for bleached paper grade sulfate market pulp in 1985 increased by 500,000 tons or almost 9% to a total of 6,227,000 annual tons. This major increase included new production from two greenfield mills brought on-stream in 1984 and 1985. In direct contrast, no major new projects are reported in this survey and some existing capacity will be diverted from market pulp production to own use. Influenced by these factors, capacity will decline by 165,000 tons in 1986 and remain virtually flat during the 1987-1989 period.

This year, for the first time, we have collected and published dried and market pulp capacity in separate categories for bleached softwood and bleached hardwood paper grade sulfate pulps. These data show that in 1985, softwood, or coniferous, pulps comprised 61% of bleached sulfate market capacity vs 39% for hardwood, or non-coniferous, pulps. This mix differs from *total* bleached paper grade sulfate capacity, which includes pulp produced for on-site papermaking, and is reported at 54% softwood vs 46% hardwood.

Norma Pace

Norma Pace
Senior Vice President
October 1986

paper & paperboard

capacity summary annual

Thousands of Tons

GRADES	1985	1986	1987	1988	1989*
TOTAL ALL GRADES	**76,622**	**77,833**	**79,593**	**80,991**	**82,051**
Total Paper & Paperboard	**74,301**	**75,618**	**77,383**	**78,777**	**79,836**
Total Paper	**37,581**	**38,102**	**39,248**	**40,140**	**40,858**
NEWSPRINT	5,788	5,859	5,917	5,956	5,968
PRINTING WRITING & RELATED	20,463	20,963	22,019	22,700	23,270
Uncoated Groundwood	1,710	1,621	1,573	1,676	1,776
Coated Groundwood	3,820	3,922	4,324	4,498	4,657
Coated Free Sheet	2,845	2,892	3,120	3,298	3,473
Uncoated Free Sheet	10,515	10,955	11,416	11,627	11,739
Cotton Fiber	187	186	189	191	192
Thin Papers	326	313	313	313	313
Solid Bleached Bristols	1,059	1,075	1,084	1,097	1,121
PACKAGING & IND. CONV.	5,985	5,773	5,661	5,691	5,710
Unbleached Kraft	3,808	3,619	3,499	3,511	3,520
Bleached Packaging & Ind. Conv.	585	546	548	548	548
Specialty Packaging	519	521	522	522	521
Special Industrial	1,074	1,087	1,093	1,111	1,121
TISSUE	5,345	5,508	5,651	5,793	5,910
Total Paperboard	**36,720**	**37,516**	**38,135**	**38,637**	**38,978**
UNBLEACHED KRAFT	18,144	18,502	18,811	19,158	19,383
of which Kraft Linerboard	16,739	17,078	17,328	17,697	17,810
SOLID BLEACHED	4,370	4,538	4,597	4,623	4,642
SEMICHEMICAL	5,411	5,528	5,557	5,597	5,654
RECYCLED	8,795	8,948	9,171	9,259	9,299
Total Construction Paper & Board and Other	**2,321**	**2,215**	**2,210**	**2,214**	**2,215**

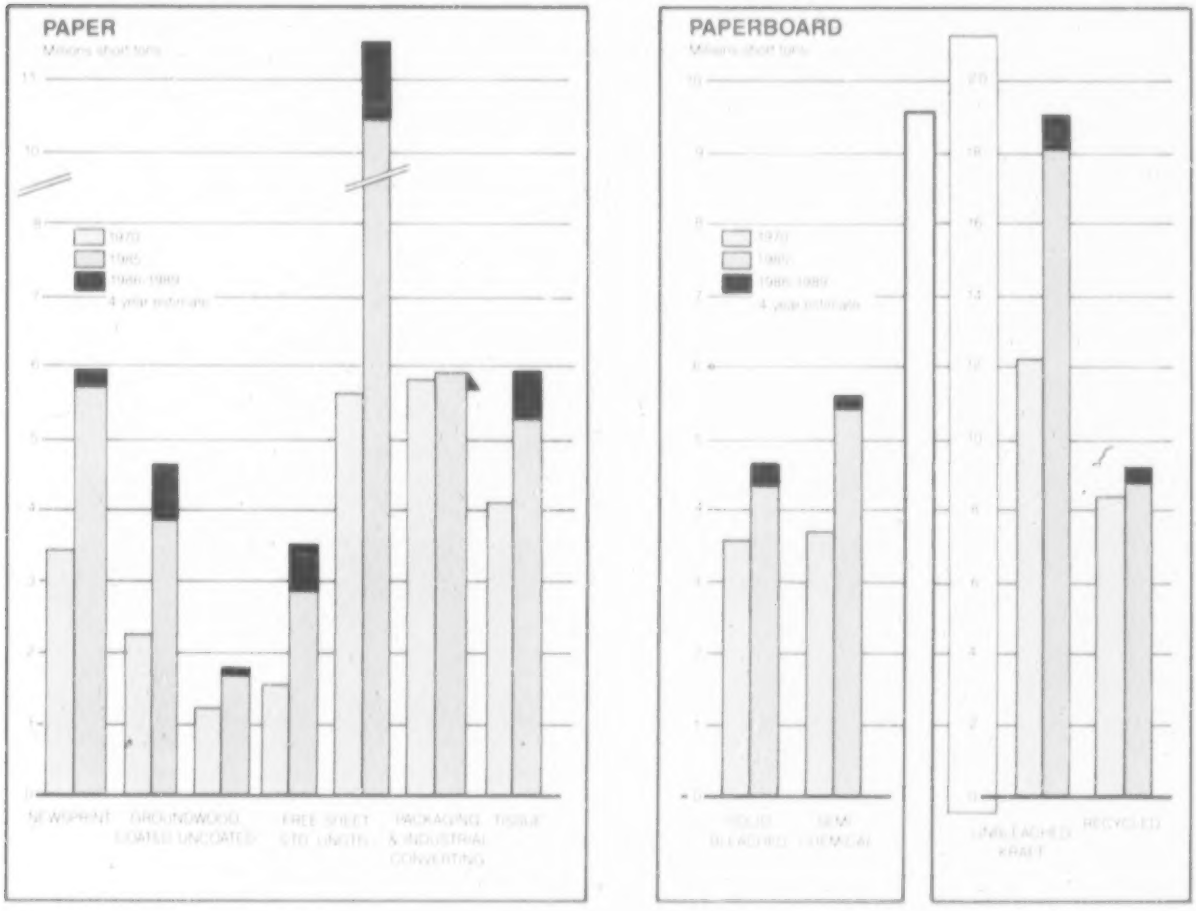
*Capacity additions presented here for 1989 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

Totals not adjusted for rounding differences.

capacity reductions—paper and paperboard mills and

	1970-1975			1976-1979		
Grades	Number of Machines	Number of Complete Mills	Annual Capacity	Number of Machines	Number of Complete Mills	Annual Capacity
TOTAL	**183**	**56**	**3,514**	**105**	**27**	**2,606**
Paper & Paperboard						
Newsprint				3	1	231
Printing Writing	68	13	1,062	27	3	468
Pkg. & Ind. Conv.	24	6	222	24	4	357
Tissue	24	8	250	16	5	154
Unbl. Kraft	2		128	1	1	240
Bl. Kraft	2		61	2	1	162
Semichemical	6	2	248	2		145
Recycled	49	23	1,362	19	5	630
Construction Paper & Board	8	4	181	11	2	219

capacity/annual growth comparison



machines shutdown

Grades	1980-1983 Number of Machines	1980-1983 Number of Complete Mills	1980-1983 Annual Capacity Removed from Survey	1980-1983 Annual Capacity Not Removed from Survey	1984-1989* Number of Machines	1984-1989* Number of Complete Mills	1984-1989* Annual Capacity Removed from Survey	1984-1989* Annual Capacity Not Removed from Survey
TOTAL	**204**	**95**	**5,399**	**105**	**95**	**24**	**3,094**	**621**
Paper & Paperboard								
Newsprint	1		26		4		334	
Printing/Writing	27	4	589		28	2	450	111
Pkg. & Ind. Conv.	22	8	239		19	4	871	130
Tissue	28	12	309		11	4	95	
Unbl. Kraft	5		722		4	1	1565	330
Bl. Kraft					1		95	
Semichemical	8	2	496		2	1	100	90
Recycled	29	16	1,061	105	6	4	165	
Construction Paper & Board	84	53	1,957		20	8	379	

Shutdowns represent machines and mills reported to the API as permanent or indefinite closures and have been removed from capacity totals. Not all of the facilities have been dismantled and some portion of their productive capacity could be restored.

1984-1989, includes machines converted to produce other grades.

wood pulp

capacity summary annual

Practical Maximum Basis
Thousands short tons

GRADES	1985	1986	1987	1988	1989*
TOTAL ALL GRADES WOOD PULP	**59,615**	**60,507**	**61,286**	**61,781**	**62,150**
Total Wood Pulp (exc. pulp for Construction Paper & Board)	**58,641**	**59,554**	**60,349**	**60,844**	**61,213**
DISSOLVING	1,454	1,444	1,444	1,444	1,444
CHEMICAL PAPER GRADES	46,544	47,384	48,005	48,319	48,594
SULFITE PAPER GRADES	1,738	1,705	1,647	1,587	1,591
SULFATE & SODA PAPER GRADES	44,806	45,679	46,358	46,732	47,003
Bleached & Semibleached Softwood	12,874	13,197	13,542	13,610	13,682
Bleached & Semibleached Hardwood	10,750	11,210	11,599	11,717	11,830
Unbleached	21,182	21,272	21,217	21,405	21,491
SEMICHEMICAL	4,650	4,625	4,579	4,561	4,578
MECHANICAL	5,964	6,069	6,289	6,487	6,565
SCREENINGS	29	32	32	32	32
Total Wood Pulp for Construction Paper & Board†	**974**	**953**	**937**	**937**	**937**

TOTAL MACHINE DRIED WOOD PULP	**10,268**	**10,016**	**9,977**	**9,969**	**10,000**
DISSOLVING	1,447	1,444	1,444	1,444	1,444
CHEMICAL PAPER GRADES	8,704	8,451	8,412	8,404	8,435
SULFITE PAPER GRADES	395	401	401	401	401
SULFATE & SODA PAPER GRADES	8,309	8,050	8,011	8,003	8,034
Bleached & Semibleached Softwood	5,070	4,977	4,875	4,878	4,899
Bleached & Semibleached Hardwood	3,096	2,938	2,963	2,949	2,959
Unbleached	143	135	173	176	176
ALL OTHER	117	121	121	121	121

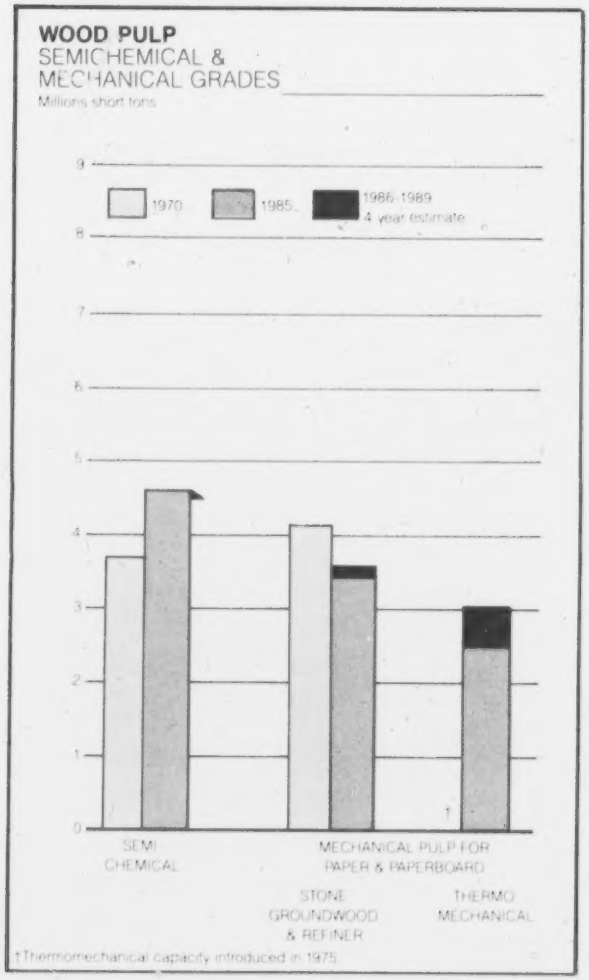
*Capacity additions presented here for 1989 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

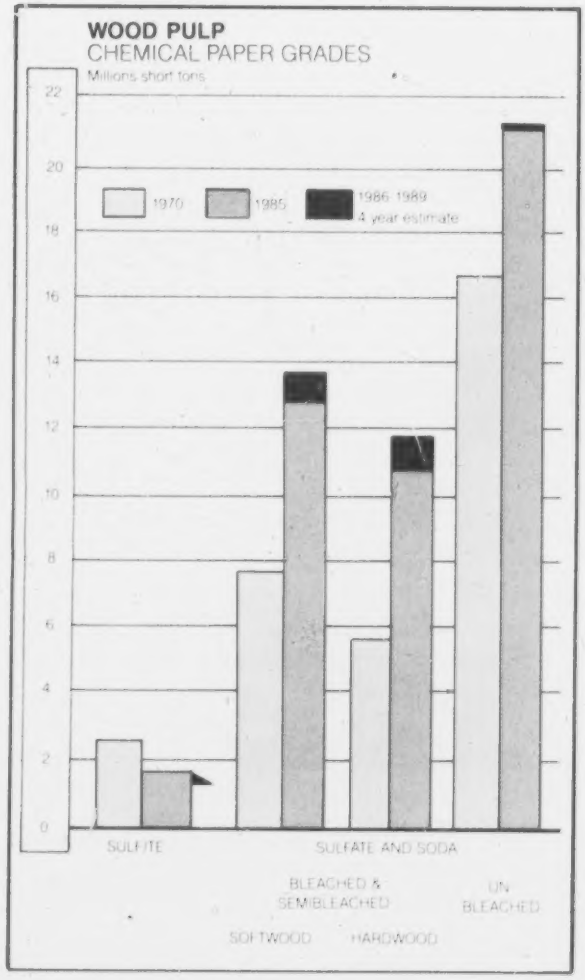
†Excludes the defibrated/exploded pulp capacity of mills that produce hard pressed board.

Totals not adjusted for rounding differences.

capacity/annual growth comparison

capacity/annual growth comparison





Practical Maximum Basis
Thousands short tons

GRADES	1985	1986	1987	1988	1989*
TOTAL MARKET WOOD PULP	**7,989**	**7,804**	**7,814**	**7,826**	**7,852**
DISSOLVING	1,446	1,443	1,443	1,443	1,443
CHEMICAL PAPER GRADES	6,529	6,347	6,357	6,369	6,395
SULFITE PAPER GRADES	302	285	281	281	281
SULFATE & SODA PAPER GRADES	6,227	6,062	6,076	6,088	6,114
Bleached & Semibleached Softwood	3,732	3,660	3,606	3,616	3,630
Bleached & Semibleached Hardwood	2,351	2,267	2,297	2,296	2,308
Unbleached	144	135	173	176	176
ALL OTHER	14	14	14	14	14

Based on information provided by producers. Reflects diversion of drying capacity to and from own use, installation of new equipment and retirement of existing equipment.

**Capacity additions presented here for 1989 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.*

° Totals not adjusted for rounding differences.

paper by grade

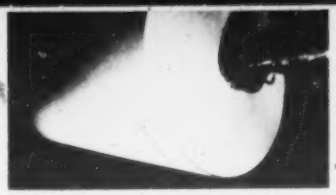
capacity/annual • year end • daily

	ALL GRADES PAPER & PAPER-BOARD Total	PAPER & PAPER-BOARD Total		Practical Maximum Basis Thousands short tons	PAPER Total	NEWS-PRINT Total	Total	Uncoated Ground-wood
ANNUAL CAPACITY 1985-1989	76,622	74,301	1985	**Annual Capacity**	37,581	5,788	20,463	1,710
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	998	998		New Machines	373		277	
	213	318		Net Improvements	148	71	223	(89)
	77,833	**75,618**	1986	**Annual Capacity**	**38,102**	5,859	20,963	1,621
	761	761		New Machines	638		586	
	999	1,004		Net Improvements	508	59	470	(48)
	79,593	**77,383**	1987	**Annual Capacity**	**39,248**	5,917	22,019	1,573
	494	494		New Machines	494		434	119
	904	899		Net Improvements	398	39	246	(16)
	80,991	**78,777**	1988	**Annual Capacity**	**40,140**	5,956	22,700	1,676
	507	507		New Machines	507		422	99
	553	553		Net Improvements	212	12	149	
	82,051	**79,836**	1989*	**Annual Capacity**	**40,858**	5,968	23,270	1,776
YEAR END CAPACITY 1985-1989	76,961	74,691	1985	**Year End Capacity**	37,470	5,774	20,651	1,681
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	881	881		New Machines	555		487	
	498	563		Net Improvements	299	113	136	(108)
	78,340	**76,135**	1986	**Year End Capacity**	**38,324**	5,887	21,274	1,573
	501	501		New Machines	501		411	
	1,377	1,368		Net Improvements	766	31	556	
	80,218	**78,004**	1987	**Year End Capacity**	**39,592**	5,917	22,241	1,573
	775	775		New Machines	775		685	179
	753	753		Net Improvements	299	45	183	(15)
	81,746	**79,532**	1988	**Year End Capacity**	**40,666**	5,962	23,109	1,736
	81	81		New Machines	81		81	54
	408	408		Net Improvements	208	9	171	
	82,235	**80,021**	1989*	**Year End Capacity**	**40,956**	5,970	23,360	1,790
YEAR END DAILY RATE 1985-1989	351	353	1985	Available Days	355	358	355	357
	219.12	**211.86**		**Daily Rate**	**105.69**	**16.12**	**58.16**	**4.71**
	352	353	1986	Available Days	355	359	355	358
	222.73	**215.66**		**Daily Rate**	**107.95**	16.40	59.86	4.39
	352	353	1987	Available Days	355	359	355	358
	228.05	**220.95**		**Daily Rate**	**111.52**	16.49	62.59	4.39
	352	353	1988	Available Days	355	359	355	358
	232.36	**225.25**		**Daily Rate**	**114.55**	16.61	65.03	4.85
	352	353	1989*	Available Days	355	359	355	358
	233.74	**226.63**		**Daily Rate**	**115.36**	16.64	65.74	5.00

*Capacity additions presented here for 1989 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

PRINTING, WRITING & RELATED						PACKAGING & INDUSTRIAL CONVERTING					TISSUE
Coated Ground-wood	Coated Free Sheet	Uncoated Free Sheet	Cotton Fiber	Thin Papers	Solid Bleached Bristols	Total	Un-bleached Kraft	Bleached Packaging & Industrial Converting	Specialty Packaging	Special Industrial	Total
3,820	**2,845**	**10,515**	**187**	**326**	**1,059**	**5,985**	**3,808**	**585**	**519**	**1,074**	**5,345**
66	20	190	1			(5)		(5)			100
36	27	250	(2)	(13)	16	(208)	(189)	(35)	2	13	62
3,922	**2,892**	**10,955**	**186**	**313**	**1,075**	**5,773**	**3,619**	**546**	**521**	**1,087**	**5,508**
162	176	241	7								52
240	52	221	(3)		9	(112)	(120)	2	1	6	91
4,324	**3,120**	**11,416**	**189**	**313**	**1,084**	**5,661**	**3,499**	**548**	**522**	**1,093**	**5,651**
107	155	40			12						61
66	23	171	1		1	31	12			18	82
4,498	**3,298**	**11,627**	**191**	**313**	**1,097**	**5,691**	**3,511**	**548**	**522**	**1,111**	**5,793**
148	157				18						85
11	18	112	1		6	19	10		(1)	10	33
4,657	**3,473**	**11,739**	**192**	**313**	**1,121**	**5,710**	**3,520**	**548**	**521**	**1,121**	**5,910**
3,795	**2,830**	**10,766**	**185**	**317**	**1,077**	**5,616**	**3,510**	**530**	**510**	**1,066**	**5,429**
76	106	298	8								68
97	65	89	(4)	(5)	3	(1)	(43)	17	11	13	52
3,967	**3,001**	**11,153**	**189**	**313**	**1,080**	**5,614**	**3,467**	**547**	**522**	**1,079**	**5,549**
208	124	79									91
247	40	262	2		5	68	44	1		22	111
4,422	**3,164**	**11,494**	**191**	**313**	**1,085**	**5,682**	**3,511**	**548**	**522**	**1,102**	**5,752**
200	276				30						91
(2)	23	177	1			21	4		1	17	50
4,620	**3,463**	**11,671**	**191**	**313**	**1,115**	**5,703**	**3,515**	**548**	**522**	**1,118**	**5,893**
20	7										
49	25	88	2		6	7	6		(3)	5	22
4,690	**3,495**	**11,759**	**193**	**313**	**1,122**	**5,711**	**3,521**	**548**	**519**	**1,123**	**5,914**
356	357	355	317	342	356	350	354	354	353	335	353
10.66	**7.92**	**30.34**	**.58**	**.93**	**3.03**	**16.03**	**9.91**	**1.50**	**1.45**	**3.18**	**15.37**
357	357	355	317	342	356	351	355	355	354	335	354
11.10	8.40	31.43	.60	.92	3.03	15.99	9.75	1.54	1.47	3.22	15.70
357	357	355	318	342	356	351	355	355	354	335	354
12.38	8.86	32.40	.60	.92	3.05	16.18	9.88	1.54	1.47	3.29	16.27
357	357	355	318	342	356	351	355	355	354	335	354
12.94	9.70	32.89	.60	.92	3.13	16.24	9.89	1.54	1.48	3.33	16.66
357	357	355	318	342	356	351	356	355	354	336	354
13.14	9.79	33.14	.61	.92	3.15	16.26	9.90	1.54	1.47	3.35	16.72

Totals not adjusted for rounding differences



paperboard by grade

capacity/annual • year end • daily

			PAPER-BOARD	UNBLEACHED KRAFT PAPERBOARD				SOLID BLEACHED PACKAGING PAPERBOARD				
	Practical Maximum Basis											
	Thousands short tons		Total	Total	Liner-board	Folding	Other	Total	Liner-board	Folding	Milk Carton & Food Service	Other
ANNUAL CAPACITY 1985-1989	**1985**	**Annual Capacity**	**36,720**	**18,144**	**16,739**	**905**	**500**	**4,370**	**131**	**2,223**	**1,643**	**173**
		New Machines	625	317	282	4	32	185	—	185	—	—
		Net Improvements	170	41	57	12	(28)	(17)	(13)	(71)	73	(7)
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	**1986**	**Annual Capacity**	**37,516**	**18,502**	**17,078**	**920**	**504**	**4,538**	**118**	**2,337**	**1,916**	**167**
		New Machines	123	—	—	—	—	88	—	88	—	—
		Net Improvements	496	309	250	61	(3)	(29)	(5)	(53)	25	4
	1987	**Annual Capacity**	**38,135**	**18,811**	**17,328**	**981**	**501**	**4,597**	**113**	**2,373**	**1,941**	**170**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	502	348	279	69	—	26	—	18	8	—
	1988	**Annual Capacity**	**38,637**	**19,158**	**17,607**	**1,050**	**501**	**4,623**	**113**	**2,391**	**1,948**	**170**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	341	225	203	21	—	19	—	17	—	2
	1989*	**Annual Capacity**	**38,978**	**19,383**	**17,810**	**1,071**	**501**	**4,642**	**113**	**2,408**	**1,949**	**172**
YEAR END CAPACITY 1985-1989	**1985**	**Year End Capacity**	**37,221**	**18,398**	**16,943**	**921**	**533**	**4,436**	**123**	**2,273**	**1,874**	**165**
		New Machines	326	—	—	—	—	273	—	273	—	—
		Net Improvements	264	258	256	35	(32)	(129)	(11)	(177)	56	3
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	**1986**	**Year End Capacity**	**37,810**	**18,655**	**17,199**	**955**	**501**	**4,580**	**113**	**2,370**	**1,930**	**168**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	602	331	239	93	—	42	—	25	16	2
	1987	**Year End Capacity**	**38,412**	**18,987**	**17,437**	**1,048**	**501**	**4,623**	**113**	**2,394**	**1,946**	**170**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	453	335	328	7	—	10	—	7	3	—
	1988	**Year End Capacity**	**38,865**	**19,322**	**17,765**	**1,055**	**501**	**4,633**	**113**	**2,401**	**1,949**	**170**
		New Machines	—	—	—	—	—	—	—	—	—	—
		Net Improvements	199	115	98	18	—	11	—	9	—	2
	1989*	**Year End Capacity**	**39,065**	**19,437**	**17,863**	**1,073**	**501**	**4,644**	**113**	**2,410**	**1,949**	**172**
YEAR END DAILY RATE 1985-1989	**1985**	Available Days	351	353	353	352	356	357	338	358	358	358
		Daily Rate	**106.17**	**52.09**	**47.97**	**2.62**	**1.50**	**12.41**	**.36**	**6.34**	**5.24**	**.46**
	1986	Available Days	351	354	354	352	357	357	339	359	357	356
		Daily Rate	**107.71**	**52.72**	**48.60**	**2.72**	**1.40**	**12.82**	**.33**	**6.60**	**5.41**	**.47**
	1987	Available Days	351	354	354	352	357	357	339	359	357	356
		Daily Rate	**109.42**	**53.65**	**49.27**	**2.98**	**1.40**	**12.94**	**.33**	**6.67**	**5.45**	**.48**
	1988	Available Days	351	354	354	352	357	357	339	359	357	356
		Daily Rate	**110.71**	**54.60**	**50.20**	**3.00**	**1.40**	**12.97**	**.33**	**6.69**	**5.46**	**.48**
	1989*	Available Days	351	354	354	352	357	357	339	359	357	356
		Daily Rate	**111.28**	**54.93**	**50.48**	**3.05**	**1.40**	**13.00**	**.33**	**6.72**	**5.46**	**.48**

*Capacity additions presented here for 1989 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

construction paper & board by grade

SEMI-CHEMICAL PAPERBOARD	RECYCLED PAPERBOARD								CONSTRUCTION PAPER & BOARD & WET MACHINE BOARD			
Total	Total	Liner-board	Corru-gating Medium	Container Chip & Filler	Folding	Set-up	Gypsum Wall Board Facing	Other	Total	Construc-tion Paper	Wet Machine Board	Insu-lating Board
5,411	**8,795**	**422**	**1,523**	**53**	**2,640**	**289**	**1,265**	**2,603**	**2,321**	**937**	**160**	**1,224**
—	124	124	—	—	—	—	—	—	—	—	—	—
117	29	2	18	(11)	(41)	(10)	24	47	(105)	(59)	—	(47)
5,528	8,948	548	1,541	41	2,599	279	1,289	2,651	2,215	877	160	1,178
—	35	35	—	—	—	—	—	—	—	—	—	—
29	188	23	117	—	31	1	7	8	(5)	(5)	—	—
5,557	9,171	605	1,658	41	2,631	280	1,296	2,659	2,210	872	160	1,178
—	—	—	—	—	—	—	—	—	—	—	—	—
40	88	8	51	—	15	1	2	12	5	4	—	—
5,597	9,259	613	1,709	41	2,646	281	1,298	2,671	2,214	877	160	1,178
—	—	—	—	—	—	—	—	—	—	—	—	—
57	41	—	14	—	15	1	1	10	—	—	—	—
5,654	9,299	613	1,723	41	2,661	282	1,299	2,680	2,215	877	160	1,178
5,444	**8,943**	**530**	**1,530**	**41**	**2,650**	**278**	**1,270**	**2,643**	**2,270**	**934**	**160**	**1,176**
—	52	52	—	—	—	—	—	—	—	—	—	—
113	22	—	18	—	(30)	1	25	8	(65)	(66)	—	1
5,557	9,018	583	1,547	41	2,620	279	1,295	2,651	2,205	868	160	1,178
—	—	—	—	—	—	—	—	—	—	—	—	—
16	213	30	151	—	19	1	2	9	9	9	—	—
5,572	9,230	613	1,699	41	2,639	281	1,297	2,660	2,214	877	160	1,178
—	—	—	—	—	—	—	—	—	—	—	—	—
58	50	—	19	—	16	1	2	12	—	—	—	—
5,630	9,280	613	1,718	41	2,655	282	1,299	2,672	2,214	877	160	1,178
—	—	—	—	—	—	—	—	—	—	—	—	—
33	40	—	11	—	19	1	—	9	—	—	—	—
5,664	9,320	613	1,729	41	2,674	283	1,299	2,682	2,215	877	160	1,178
354	340	353	348	342	338	332	339	337	313	334	295	300
15.39	**26.28**	**1.50**	**4.40**	**.12**	**7.83**	**.84**	**3.75**	**7.84**	**7.26**	**2.80**	**.54**	**3.92**
354	341	353	349	345	338	333	339	337	312	333	295	300
15.70	26.47	1.65	4.43	.12	7.75	.84	3.82	7.86	7.07	2.60	.54	3.92
354	341	353	349	345	338	333	339	337	312	332	295	300
15.75	27.08	1.74	4.86	.12	7.81	.84	3.83	7.89	7.10	2.64	.54	3.92
354	341	353	349	345	338	333	339	337	312	332	295	300
15.92	27.23	1.74	4.92	.12	7.85	.85	3.83	7.92	7.11	2.64	.54	3.92
354	341	353	349	345	338	333	339	337	312	332	294	300
16.01	27.34	1.74	4.95	.12	7.91	.85	3.83	7.95	7.11	2.64	.54	3.92

Totals not adjusted for rounding differences.

wood pulp by grade

capacity/annual • year end • daily

for paper & paperboard

		Practical Maximum Basis	ALL GRADES WOOD PULP	WOOD PULP (exc. pulp for Construction Paper & Board)	DISSOL-VING	CHEMICAL PAPER GRADES				
							SULFITE			SULFATE
										Blea Semib
		Thousands short tons	Total	Total	Total	Total	Total	Bleached	Unbleached	Total	Hardwood
ANNUAL CAPACITY 1985-1989	**1985**	**Annual Capacity**	**59,615**	**58,641**	**1,454**	**46,544**	**1,738**	**1,482**	**256**	**44,806**	**10,750**
		New Machines	222	222		204				204	189
		Net Improvements	670	691	(10)	636	(33)	23	(56)	669	271
Annual Capacity includes changes in capacity only for the portion of the year in which they are actually effective	**1986**	**Annual Capacity**	**60,507**	**59,554**	**1,444**	**47,384**	**1,705**	**1,505**	**200**	**45,679**	**11,210**
		New Machines	276	276		115				115	76
		Net Improvements	503	518		506	(58)	(58)		564	313
	1987	**Annual Capacity**	**61,286**	**60,349**	**1,444**	**48,005**	**1,647**	**1,447**	**200**	**46,358**	**11,599**
		New Machines	221	221		60				60	29
		Net Improvements	274	274		255	(60)	(60)		314	89
	1988	**Annual Capacity**	**61,781**	**60,844**	**1,444**	**48,319**	**1,587**	**1,387**	**200**	**46,732**	**11,717**
		New Machines	147	147		84				84	43
		Net Improvements	222	222		190	4	4		186	69
	1989*	**Annual Capacity**	**62,150**	**61,213**	**1,444**	**48,594**	**1,591**	**1,391**	**200**	**47,003**	**11,830**
YEAR END CAPACITY 1985-1989	**1985**	**Year End Capacity**	**59,836**	**58,868**	**1,444**	**46,900**	**1,697**	**1,497**	**200**	**45,203**	**11,027**
		New Machines	194	194		139				139	96
		Net Improvements	629	659		387	9	9		378	212
Year End Capacity is calculated by multiplying Daily Rate by number of Available Days	**1986**	**Year End Capacity**	**60,660**	**59,723**	**1,444**	**47,426**	**1,705**	**1,506**	**200**	**45,720**	**11,335**
		New Machines	199	199		14				14	
		Net Improvements	599	599		694	(123)	(123)		816	315
	1987	**Year End Capacity**	**61,458**	**60,521**	**1,444**	**48,133**	**1,583**	**1,383**	**200**	**46,551**	**11,651**
		New Machines	277	277		141				141	72
		Net Improvements	262	262		212	5	5		207	75
	1988	**Year End Capacity**	**61,997**	**61,060**	**1,444**	**48,486**	**1,587**	**1,387**	**200**	**46,899**	**11,797**
		New Machines	36	36							
		Net Improvements	191	191		168	4	4		164	58
	1989*	**Year End Capacity**	**62,225**	**61,288**	**1,444**	**48,654**	**1,591**	**1,391**	**200**	**47,063**	**11,855**
YEAR END DAILY RATE 1985-1989	**1985**	Available Days	355	356	351	356	351	350	359	356	356
		Daily Rate	**168.52**	**165.41**	**4.12**	**131.81**	**4.83**	**4.28**	**.56**	**126.98**	**30.96**
	1986	Available Days	355	356	351	356	351	350	359	356	356
		Daily Rate	**170.80**	**167.78**	4.12	133.27	4.86	4.30	.56	128.41	31.82
	1987	Available Days	355	356	351	356	353	352	359	356	356
		Daily Rate	**173.04**	**170.02**	4.12	135.25	4.49	3.93	.56	130.76	32.71
	1988	Available Days	355	356	351	356	353	352	359	356	356
		Daily Rate	**174.57**	**171.55**	4.12	136.26	4.50	3.94	.56	131.76	33.13
	1989*	Available Days	355	356	351	356	353	352	359	356	356
		Daily Rate	**175.21**	**172.19**	4.12	136.73	4.51	3.96	.56	132.22	33.29

*Capacity additions presented here for 1989 include only presently known commitments and do not necessarily represent final expansion plans of the industry for that year.

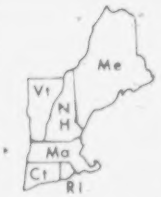
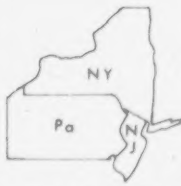
AND SODA		SEMICHEMICAL			MECHANICAL				SCREEN-INGS	WOOD PULP FOR CONSTRUCTION PAPER & BOARD		
ned & eached												
oftwood	Unbleached	Total	Bleached	Unbleached	Total	Stone Ground-wood	Refiner	Thermo-mechan-ical	Total	Total	Stone Ground-wood & Refiner	Defib-rated Exploded†
12,874	**21,182**	**4,650**	**395**	**4,255**	**5,964**	**3,006**	**459**	**2,499**	**29**	**974**	**269**	**705**
14	—	—	—	—	18	—	—	18	—	—	—	—
308	89	(26)	7	(33)	87	14	(49)	122	3	(21)	(18)	(3)
13,197	**21,272**	**4,625**	**402**	**4,222**	**6,069**	**3,020**	**410**	**2,639**	**32**	**953**	**251**	**702**
39	—	—	—	—	161	—	—	161	—	—	—	—
306	(55)	(46)		(46)	58	(38)		96		(15)		(15)
13,542	**21,217**	**4,579**	**402**	**4,177**	**6,289**	**2,983**	**410**	**2,896**	**32**	**937**	**251**	**687**
31	—	—	—	—	161	—	79	82	—	—	—	—
37	188	(18)		(18)	38	10		27	—	—	—	—
13,610	**21,405**	**4,561**	**402**	**4,159**	**6,487**	**2,993**	**489**	**3,005**	**32**	**937**	**251**	**687**
41	—	—	—	—	63	—	55	8	—	—	—	—
31	86	17		17	15	9		6	—	—	—	—
13,682	**21,491**	**4,578**	**402**	**4,175**	**6,565**	**3,002**	**544**	**3,019**	**32**	**937**	**251**	**687**
13,076	**21,100**	**4,653**	**402**	**4,251**	**5,840**	**2,964**	**410**	**2,465**	**32**	**968**	**251**	**717**
43	—	—	—	—	55	—	—	55	—	—	—	—
176	(10)	(56)		(56)	329	86		243	—	(30)		(30)
13,295	**21,090**	**4,597**	**402**	**4,194**	**6,224**	**3,051**	**410**	**2,763**	**32**	**937**	**251**	**687**
14	—	—	—	—	186	—	—	186	—	—	—	—
269	232	(48)		(48)	(47)	(74)		27	—	—	—	—
13,578	**21,322**	**4,549**	**402**	**4,147**	**6,362**	**2,976**	**410**	**2,976**	**32**	**937**	**251**	**687**
69	—	—	—	—	136	—	107	29	—	—	—	—
(7)	139	16		16	35	25		10	—	—	—	—
13,640	**21,461**	**4,565**	**402**	**4,162**	**6,533**	**3,001**	**518**	**3,014**	**32**	**937**	**251**	**687**
50	57	16		16	36	1	36	6	—	—	—	—
13,691	**21,518**	**4,581**	**402**	**4,179**	**6,576**	**3,002**	**554**	**3,020**	**32**	**937**	**251**	**687**
356	356	354	356	354	359	358	361	360	357	311	335	303
36.69	**59.33**	**13.14**	**1.13**	**12.01**	**16.25**	**8.28**	**1.14**	**6.84**	**.09**	**3.11**	**.75**	**2.36**
356	356	354	356	354	359	358	361	360	357	310	335	302
37.31	**59.28**	**12.98**	**1.13**	**11.85**	**17.33**	**8.52**	**1.14**	**7.68**	**.09**	**3.02**	**.75**	**2.27**
356	356	354	356	354	359	358	361	360	357	310	335	302
38.11	**59.94**	**12.85**	**1.13**	**11.72**	**17.72**	**8.31**	**1.14**	**8.27**	**.09**	**3.02**	**.75**	**2.27**
356	356	354	356	354	359	358	360	360	357	310	335	302
38.29	**60.33**	**12.89**	**1.13**	**11.76**	**18.19**	**8.38**	**1.44**	**8.37**	**.09**	**3.02**	**.75**	**2.27**
356	356	354	356	354	359	358	360	360	357	310	335	302
38.43	**60.49**	**12.94**	**1.13**	**11.81**	**18.31**	**8.39**	**1.54**	**8.39**	**.09**	**3.02**	**.75**	**2.27**

†Excludes the defibrated/exploded pulp capacity of mills that produce hard pressed board.

Totals not adjusted for rounding differences.

annual capacity/regional distribution

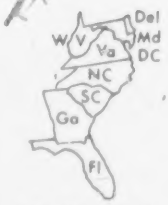
paper & paperboard

TOTAL U.S. CAPACITY		GRADES	 NEW ENGLAND		 MID-ATLANTIC	
1985	1989	*Practical Maximum Basis/Thousands short tons*	1985	1989	1985	1989
76,622	**82,051**	**TOTAL ALL GRADES PAPER & PAPERBOARD**	**6,191**	**6,430**	**5,782**	**5,956**
74,301	**79,836**	**TOTAL PAPER & PAPERBOARD**	**6,133**	**6,372**	**5,307**	**5,497**
37,581	**40,858**	**TOTAL PAPER**	**5,295**	**5,517**	**3,893**	**4,041**
5,788	5,968	NEWSPRINT	N.A.	N.A.	N.A.	N.A.
20,463	23,270	PRINTING, WRITING & RELATED	3,920	4,102	2,356	2,416
1,710	1,776	Uncoated Groundwood	803	645	N.A.	N.A.
3,820	4,657	Coated Groundwood	1,328	1,374	271	273
2,845	3,473	Coated Free Sheet	398	642	144	156
11,028	12,244	Uncoated Free Sheet	1,386	1,437	1,762	1,807
1,059	1,121	Solid Bleached Bristols	5	4	18	16
5,985	5,710	PACKAGING & INDUSTRIAL CONVERTING	498	520	306	305
5,345	5,910	TISSUE	531	530	1,022	1,110
36,720	**38,978**	**TOTAL PAPERBOARD**	**838**	**855**	**1,414**	**1,456**
18,144	19,383	UNBLEACHED KRAFT	—	—	—	—
16,739	17,810	of which Kraft Linerboard	—	—	—	—
4,370	4,642	SOLID BLEACHED	N.A.	N.A.	—	—
5,411	5,654	SEMICHEMICAL	N.A.	N.A.	—	—
8,795	9,299	RECYCLED	709	729	1,414	1,456
2,321	**2,215**	**TOTAL CONSTRUCTION PAPER & BOARD**	**58**	**58**	**475**	**459**

wood pulp

59,615	**62,150**	**TOTAL ALL GRADES WOOD PULP**	**3,472**	**3,470**	**1,394**	**1,408**
58,641	**61,213**	**TOTAL WOOD PULP (exc. pulp for Construction Paper & Board)**	**3,393**	**3,391**	**1,376**	**1,390**
1,454	1,444	DISSOLVING	—	—	—	—
1,738	1,591	SULFITE PAPER GRADES	N.A.	N.A.	N.A.	N.A.
44,835	47,035	SULFATE & SODA PAPER GRADES	2,029	2,059	504	516
12,874	13,682	Bleached & Semibleached Softwood	628	631	148	153
10,750	11,830	Bleached & Semibleached Hardwood	1,354	1,372	357	363
21,211	21,523	Unbleached	N.A.	N.A.	—	—
4,650	4,578	SEMICHEMICAL	N.A.	N.A.	444	448
5,964	6,565	MECHANICAL	1,028	1,052	186	183
974	**937**	**WOOD PULP FOR CONSTRUCTION PAPER & BOARD[3]**	**79**	**79**	**18**	**18**

(1) Includes cotton fiber and thin papers.
(2) Includes screenings.
(3) Excludes defibrated/exploded pulp capacity of mills that produce hard pressed board.
N.A. Not Available



E. NO. CENTRAL		W. NO. CENTRAL		SO. ATLANTIC		E. SO. CENTRAL		W. SO. CENTRAL		MOUNTAIN & PACIFIC*	
1985	1989	1985	1989	1985	1989	1985	1989	1985	1989	1985	1989
12,206	**12,837**	**1,724**	**2,176**	**18,421**	**20,096**	**10,206**	**10,862**	**11,025**	**12,296**	**11,066**	**11,399**
11,937	**12,591**	**1,536**	**2,008**	**17,909**	**19,569**	**9,799**	**10,449**	**10,759**	**12,051**	**10,920**	**11,301**
7,302	**7,742**	**1,049**	**1,503**	**6,043**	**6,688**	**4,117**	**4,464**	**4,548**	**5,468**	**5,333**	**5,436**
N.A.	N.A.	—	—	999	1,062	1,089	1,106	1,142	1,173	1,848	1,875
4,913	5,233	1,032	1,488	2,601	3,216	2,165	2,521	1,669	2,426	1,808	1,868
252	261	N.A.	N.A.	N.A.	N.A.	138	138	N.A.	N.A.	195	178
1,165	1,379	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	90	91
994	1,000	N.A.	N.A.	N.A.	N.A.	347	360	N.A.	N.A.	154	164
2,374	2,460	242	204	1,599	1,932	1,420	1,775	949	1,268	1,297	1,360
127	133	—	—	399	428	N.A.	N.A.	355	394	72	75
856	865	N.A.	N.A.	1,977	1,709	307	166	1,241	1,324	783	805
1,380	1,465	—	—	467	701	556	672	496	545	894	888
4,635	**4,848**	**488**	**504**	**11,866**	**12,881**	**5,682**	**5,986**	**6,211**	**6,582**	**5,587**	**5,866**
—	—	—	—	7,841	8,385	3,543	3,775	3,719	4,017	3,042	3,206
—	—	—	—	7,385	7,926	3,127	3,323	3,231	3,403	2,996	3,158
N.A.	N.A.	—	—	1,734	1,967	777	800	1,352	1,358	478	491
1,677	1,880	N.A.	N.A.	1,087	1,150	959	1,006	760	784	755	661
2,956	2,966	417	434	1,204	1,380	402	405	380	422	1,313	1,507
269	**246**	**188**	**168**	**512**	**527**	**407**	**413**	**266**	**245**	**146**	**98**
3,537	**3,975**	**701**	**817**	**18,982**	**19,995**	**11,126**	**11,630**	**10,337**	**10,753**	**10,064**	**10,101**
3,411	**3,837**	**629**	**769**	**18,724**	**19,737**	**10,891**	**11,391**	**10,226**	**10,670**	**9,990**	**10,027**
—	—	—	—	568	574	N.A.	N.A.	—	—	670	655
462	354	—	—	—	—	—	—	—	—	778	795
1,238	1,602	315	312	16,544	17,414	8,991	9,352	8,609	9,003	6,605	6,776
313	385	N.A.	N.A.	4,265	4,759	2,391	2,564	2,273	2,318	2,776	2,786
694	988	N.A.	N.A.	3,152	3,660	2,947	3,080	1,855	1,977	166	168
N.A.	N.A.	N.A.	N.A.	9,126	8,995	3,653	3,706	4,480	4,708	3,662	3,821
1,306	1,370	N.A.	N.A.	803	826	796	723	618	622	558	462
406	511	269	412	810	923	887	1,101	999	1,045	1,378	1,339
126	**138**	**72**	**48**	**258**	**258**	**235**	**239**	**111**	**83**	**74**	**74**

Totals not adjusted for rounding differences

*Includes Alaska

world capacity

wood pulp (except defibrated/exploded & screenings)

Thousands of METRIC t

	TOTALS		Percent Increase	MECHANICAL		SEMICHEMICAL		CHEMICAL PAPER GRADES		
	1985	1989		1985	1989	1985	1989	1985	1989	of which 1985
WORLD TOTAL	**157,180**	**168,388**	**7.1**	36,343	40,417	9,611	9,722	104,984	111,982	28,667
DEVELOPED MARKET ECONOMIES	**126,678**	**133,781**	**5.6**	30,581	33,987	7,702	7,705	84,719	88,622	23,143
NORTH AMERICA	**76,622**	**79,990**	**4.4**	15,272	16,621	4,667	4,617	55,098	57,176	12,852
U.S.	**53,199**	**55,532**	**4.4**	5,411	5,956	4,218	4,153	42,251	44,113	5,923
Canada	**23,423**	**24,458**	**4.4**	9,861	10,665	449	464	12,847	13,063	6,929
JAPAN	**12,463**	**12,765**	**2.4**	2,574	2,639	1,336	1,336	8,104	8,476	957
WESTERN EUROPE	**33,050**	**36,313**	**9.9**	11,245	13,187	1,151	1,201	19,424	20,767	8,497
E.E.C.	**6,304**	**7,115**	**12.9**	2,961	3,313	373	388	2,801	3,233	911
Nordic countries	**21,180**	**23,240**	**9.7**	7,365	8,875	710	745	12,365	12,945	5,360
Rest of Western Europe	**5,566**	**5,957**	**7.0**	939	999	68	68	4,258	4,589	2,226
OCEANIA	**2,681**	**2,844**	**6.1**	1,120	1,170	384	387	1,177	1,287	447
OTHERS	**1,862**	**1,870**	**0.4**	370	370	164	164	916	916	390
DEVELOPING MARKET ECONOMIES	**9,567**	**12,649**	**32.2**	1,635	1,991	653	712	6,982	9,435	2,886
AFRICA	**717**	**1,005**	**40.2**	30	140	22	25	665	840	501
LATIN AMERICA	**6,503**	**8,612**	**32.4**	890	1,096	366	401	5,171	7,039	2,131
of which: Brazil	**3,884**	**5,545**	**42.8**	443	619	127	127	3,252	4,637	1,449
Mexico	**706**	**854**	**21.0**	150	180	—	—	556	674	
ASIA	**2,347**	**3,032**	**29.2**	716	755	265	286	1,146	1,556	254
CENTRALLY PLANNED ECONOMIES	**20,935**	**21,958**	**4.9**	4,127	4,439	1,256	1,305	13,283	13,925	2,638
of which: USSR	**13,750**	**13,750**	—	2,500	2,500	850	850	8,700	8,700	2,000

Totals not adjusted for rounding differences

*No data available for 1989

structure of u.s. paper, paperboard, wood pulp industry—

mill size

ANNUAL CAPACITY RANGE	PAPER & PAPERBOARD		WOOD PULP	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL	**561**	**100%**	**223**	**100%**

Capacities measured on 3 [illegible] maximum basis

capacity in integrated & non integrated

Thousands short to

GRADES	ANNUAL CAPACITY		
	INTEGRATED TO WOOD PULP	NOT INTEGRATED TO WOOD PULP	TOTAL
TOTAL	**57,755**	**18,867**	**76,622**
PAPER	28,221	9,359	37,581
Newsprint	5,294	494	5,788
Uncoated Groundwood	1,387	322	1,710
Coated Groundwood	3,665	155	3,820
Coated Free Sheet	2,080	765	2,845
Uncoated Free Sheet*	8,008	2,694	10,702
Thin Papers	84	242	326
Solid Bleached Bristols	962	97	1,059
Pkg. & Ind. Conv.	4,572	1,414	5,985
Tissue	2,169	3,176	5,345
PAPERBOARD	28,245	8,475	36,720
Unbleached Kraft	18,144	—	18,144
Solid Bleached	4,368	2	4,370
Semichemical	5,411	—	5,411
Recycled	323	8,473	8,795
CONSTRUCTION PAPER & BOARD	1,390	931	2,321

*Includes cotton fiber Totals not adjusted for rounding differences

Integrated mills include all mills with active on-site wood pulp capacity, whether or not this capacity provides a significant portion of total furnish

paper & paperboard (except insulating & hard pressed board)

Thousands of METRIC tons

market	DISSOLVING		TOTALS			NEWSPRINT		PRINTING & WRITING		WRAPPING		ALL OTHERS	
1988*	1985	1989	1985	1989	Percent Increase	1985	1989	1985	1989	1985	1989	1985	1989
29,067	6,241	6,268	**221,338**	**241,096**	**8.9**	31,709	33,966	57,620	66,597	106,624	112,987	25,385	27,546
23,345	3,676	3,468	**170,465**	**183,351**	7.6	26,463	28,083	46,783	53,679	78,061	81,147	19,158	20,442
12,767	1,585	1,576	**85,184**	**90,517**	6.3	15,071	15,714	20,817	24,126	40,554	41,399	8,742	9,278
5,704	1,319	1,310	**69,401**	**73,368**	5.7	5,251	5,414	18,564	21,111	37,324	38,061	8,262	8,782
7,063	266	266	**15,783**	**17,149**	8.6	9,820	10,300	2,253	3,015	3,230	3,338	480	496
957	449	314	**24,043**	**25,096**	4.4	2,789	2,925	6,403	6,567	10,832	11,385	4,019	4,219
8,751	1,230	1,158	**56,510**	**62,530**	10.7	7,457	8,063	18,895	22,243	24,167	25,739	5,991	6,485
1,031	179	182	**29,675**	**33,445**	12.7	2,017	2,448	10,839	12,832	13,146	14,168	3,673	3,997
5,360	750	675	**17,495**	**19,620**	12.1	4,516	4,655	5,345	6,650	6,380	6,890	1,255	1,425
2,360	301	301	**9,340**	**9,465**	1.3	925	960	2,711	2,761	4,641	4,681	1,063	1,063
480			**2,858**	**3,176**	11.1	700	935	304	375	1,589	1,591	265	275
390	412	420	**1,870**	**2,032**	8.7	446	446	364	368	919	1,033	141	185
3,101	296	511	**21,519**	**24,341**	13.1	2,350	2,730	5,258	6,087	11,631	13,084	2,280	2,440
507			**832**	**1,167**	40.3	18	130	260	384	490	587	64	66
2,314	76	76	**12,234**	**13,578**	11.0	1,155	1,223	2,689	3,014	6,601	7,421	1,789	1,920
1,497	62	62	**3,325**	**3,704**	11.4	390	415	594	655	1,804	2,076	537	558
			4,688	**5,210**	11.1	232	259	1,201	1,405	2,688	2,944	567	602
280	220	435	**8,453**	**9,596**	13.5	1,177	1,377	2,309	2,689	4,501	5,019	466	511
2,621	2,269	2,289	**29,354**	**33,404**	13.8	2,896	3,153	5,579	6,831	16,932	18,756	3,947	4,664
2,000	1,700	1,700	**14,000**	**14,000**	—	1,950	1,950	1,700	1,700	9,465	9,465	885	885

Source: Food and Agriculture Organization of the United Nations; U.S. capacity American Paper Institute

1985
paper & paperboard mills

The degree of integration to wood pulp for each mill was calculated by dividing on-site wood pulp capacity by paper & paperboard capacity

DEGREE OF INTEGRATION TO WOOD PULP	NEW ENGLAND		MID-ATLANTIC		E. NO. CENTRAL		W. NO. CENTRAL	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL REGION	**84**	**100%**	**100**	**100%**	**133**	**100%**	**17**	**100%**
100% or more	8	20	3	6	1	1	1	8
80% to 99%	1	8	—	—	5	9	2	3
60% to 79%	4	19	4	10	9	15	4	20
40% to 59%	1	3	5	16	11	13	2	32
20% to 39%	2	8	2	5	4	7	—	—
01% to 19%	—	—	—	—	—	—	—	—
Not integrated	68	42	86	63	103	55	8	37

All data based on machines in place January 1985

DEGREE OF INTEGRATION TO WOOD PULP	SO. ATLANTIC		E. SO. CENTRAL		W. SO. CENTRAL		MOUNTAIN & PACIFIC	
	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY	NUMBER OF MILLS	SHARE OF TOTAL CAPACITY
TOTAL REGION	**76**	**100%**	**43**	**100%**	**42**	**100%**	**66**	**100%**
100% or more	16	39	11	35	13	44	15	44
80% to 99%	17	40	9	46	9	35	6	16
60% to 79%	5	9	5	8	2	9	5	11
40% to 59%	3	1	2	2	—	—	2	5
20% to 39%	2	2	1	2	4	3	—	—
01% to 19%	1	1	—	—	1	1	1	2
Not integrated	32	8	15	7	13	8	38	20

All data based on machines in place January 1985

structure of U.S. paper & paperboa

machines in operation 1985

size of machines—by principal grade produced

Machine Annual Capacity (Thousands short tons)	Paper: Newsprint Number of Machines	Newsprint Share of Total Capacity	Printing & Writing Number of Machines	Printing & Writing Share of Total Capacity	Packaging & Ind. Conv. Number of Machines	Packaging & Ind. Conv. Share of Total Capacity	Tissue Number of Machines	Tissue Share of Total Capacity
Total	45	100%	441	100%	181	100%	210	100%
0-5	—	—	48	1	37	2	26	2
6-10	—	—	36	1	42	6	25	4
11-15	—	—	29	2	24	6	28	7
16-20	—	—	41	4	15	5	24	8
21-30	1	—	63	8	23	10	30	14
31-40	3	2	44	7	5	3	34	22
41-50	1	1	39	9	2	2	25	21
51-75	5	5	54	17	7	7	14	15
76-100	2	3	32	13	7	11	4	7
101-125	7	14	21	12	8	15	—	—
126-150	12	28	10	6	4	10	—	—
151-200	9	27	19	15	5	14	—	—
201-250	4	16	5	5	2	9	—	—
251-300	1	4	—	—	—	—	—	—

All data based on machines in place January 1985

age of machines—by principal grade produced

Year Machine Installed Or Rebuilt*	Paper: Newsprint Number of Machines	Newsprint Share of Total Capacity	Printing & Writing Number of Machines	Printing & Writing Share of Total Capacity	Packaging & Ind. Conv. Number of Machines	Packaging & Ind. Conv. Share of Total Capacity	Tissue Number of Machines	Tissue Share of Total Capacity
Total	45		441		181		210	
No Data Available	3		77		22		47	
Total Sample	42	100%	364	100%	159	100%	163	100%
1984	4	9	10	4	3	3	2	1
1983	2	4	13	4	9	7	5	4
1982	1	2	22	7	10	12	3	1
1981	4	13	17	6	7	13	7	7
1980	2	6	20	8	8	5	5	5
1979	5	16	9	2	2	1	5	5
1978	—	—	12	2	3	2	7	5
1977	1	1	15	5	5	6	5	4
1976	1	3	17	5	5	3	9	4
1971-1975	5	12	46	14	24	10	20	12
1966-1970	6	15	69	20	30	16	37	25
1961-1965	—	—	52	11	17	3	32	19
1956-1960	4	9	22	5	8	1	8	3
1951-1955	4	8	17	4	7	8	1	1
Prior to 1950	3	2	23	3	21	10	17	4

All data based on machines in place January 1985

age of machines—by geographic region

Year Machine Installed Or Rebuilt*	Total U.S. Number of Machines	Total U.S. Share of Total Capacity	New England Number of Machines	New England Share of Total Capacity	Mid-Atlantic Number of Machines	Mid-Atlantic Share of Total Capacity	E. No. Central Number of Machines	E. No. Central Share of Total Capacity
Total	1,267		222		210		324	
No Data Available	231		47		63		49	
Total Sample	1,036	100%	175	100%	147	100%	275	100%
1984	21	2	—	—	2	1	7	4
1983	35	3	3	—	7	4	12	4
1982	54	5	16	10	6	3	12	8
1981	54	5	2	3	7	7	15	6
1980	48	5	9	7	4	4	12	6
1979	36	3	4	2	3	2	7	4
1978	35	3	6	4	4	1	7	4
1977	37	4	10	8	1	—	7	4
1976	39	4	6	5	4	2	13	3
1971-1975	161	16	25	18	26	22	42	18
1966-1970	184	18	32	18	33	25	53	19
1961-1965	126	12	26	11	19	12	28	7
1956-1960	62	6	6	2	14	9	17	3
1951-1955	45	4	8	7	2	2	12	3
Prior to 1950	99	10	22	5	15	6	31	7

All data based on machines in place January 1985

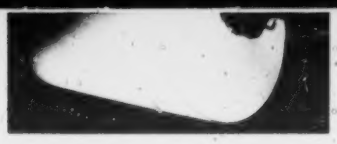
Machine Annual Capacity (Thousands short tons)	Paperboard: Unbleached Kraft Number of Machines	Unbleached Kraft Share of Total Capacity	Solid Bleached Number of Machines	Solid Bleached Share of Total Capacity	Semichemical Number of Machines	Semichemical Share of Total Capacity	Recycled Number of Machines	Recycled Share of Total Capacity	Construction Grades: Construction Number of Machines	Construction Share of Total Capacity
Total	68	100%	25	100%	40	100%	185	100%	72	100%
0-5	—	—	—	—	—	—	5	—	9	1
6-10	—	—	—	—	—	—	2	—	11	4
11-15	—	—	—	—	—	—	14	2	9	5
16-20	—	—	—	—	—	—	11	2	4	3
21-30	—	—	—	—	—	—	35	11	10	11
31-40	—	—	—	—	1	1	24	10	6	9
41-50	—	—	1	1	—	—	28	15	7	13
51-75	1	—	1	2	5	6	42	29	7	18
76-100	1	1	1	2	5	8	12	12	7	25
101-125	1	1	—	—	11	22	7	9	1	5
126-150	3	2	1	3	6	15	2	3	1	6
151-200	13	12	16	61	6	19	2	4	—	—
201-250	14	17	4	21	4	17	1	3	—	—
251-300	9	14	—	—	—	—	—	—	—	—
301-400	20	38	—	—	2	12	—	—	—	—
over 400	6	15	1	10	—	—	—	—	—	—

Year Machine Installed Or Rebuilt*	Paperboard: Unbleached Kraft Number of Machines	Unbleached Kraft Share of Total Capacity	Solid Bleached Number of Machines	Solid Bleached Share of Total Capacity	Semichemical Number of Machines	Semichemical Share of Total Capacity	Recycled Number of Machines	Recycled Share of Total Capacity	Construction Grades: Construction Number of Machines	Construction Share of Total Capacity
Total	68		25		40		185		72	
No Data Available	—		—		—		45		37	
Total Sample	68	100%	25	100%	40	100%	140	100%	35	100%
1984	—	—	—	—	1	5	1	1	—	—
1983	2	3	—	—	—	—	5	4	—	—
1982	5	7	2	6	3	9	7	6	—	—
1981	4	6	—	—	2	8	11	8	—	—
1980	7	10	—	—	1	2	6	4	—	—
1979	6	6	3	12	2	3	5	6	—	—
1978	4	7	1	3	5	14	2	1	1	—
1977	2	3	1	4	1	3	5	6	2	8
1976	1	2	1	5	1	1	3	2	1	2
1971-1975	9	15	5	22	13	32	27	23	14	43
1966-1970	10	18	3	19	7	15	20	13	4	5
1961-1965	8	11	3	11	2	5	7	4	5	9
1956-1960	3	4	5	14	2	3	6	4	2	14
1951-1955	3	4	1	4	—	—	10	5	1	1
Prior to 1950	4	4	—	—	—	—	25	13	5	18

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.

Year Machine Installed Or Rebuilt*	W. No. Central Number of Machines	W. No. Central Share of Total Capacity	South Atlantic Number of Machines	South Atlantic Share of Total Capacity	E. So. Central Number of Machines	E. So. Central Share of Total Capacity	W. So. Central Number of Machines	W. So. Central Share of Total Capacity	Mountain & Pacific Number of Machines	Mountain & Pacific Share of Total Capacity
Total	32		160		84		93		142	
No Data Available	4		29		12		11		16	
Total Sample	28	100%	131	100%	72	100%	82	100%	126	100%
1984	—	—	4	4	1	1	3	2	4	4
1983	2	5	5	4	3	5	—	—	3	2
1982	1	11	6	4	4	10	4	7	5	7
1981	1	3	11	8	3	3	6	11	9	9
1980	2	4	7	6	6	10	1	2	7	10
1979	—	—	9	10	2	3	3	4	8	7
1978	1	3	8	9	1	1	3	3	5	3
1977	—	—	4	3	2	5	5	5	8	5
1976	2	6	4	4	3	2	1	1	6	4
1971-1975	4	18	22	13	12	13	16	22	14	16
1966-1970	4	16	17	13	10	21	18	24	17	10
1961-1965	7	19	10	6	9	8	8	8	19	13
1956-1960	1	4	9	6	7	8	5	6	3	2
1951-1955	2	7	6	5	4	7	4	2	7	5
Prior to 1950	1	4	9	5	5	3	5	3	11	3

*Rebuilds include only modifications which significantly extended the useful life or increased the capacity of a machine.



fiber sources for paper/paperboard/

fiber consumption in paper & paperboard manufacture

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East-North Central	West-North Central	South Atlantic	East-South Central	West-South Central	Mountain & Pacific
1985										
TOTAL FIBER	**70,153**	**100.0**	**5,160**	**4,994**	**10,906**	**1,440**	**17,224**	**9,584**	**10,285**	**10,560**
TOTAL WOOD PULP	53,308	76.0	3,927	2,788	5,882	897	14,441	8,494	8,968	7,909
Manufactured on-site	44,344	63.2	2,231	1,162	2,679	597	13,857	8,095	8,752	6,970
*Purchased & transferred	8,964	12.8	1,696	1,626	3,203	300	584	399	216	940
†TOTAL RECYCLABLE PAPER	16,550	23.6	1,169	2,178	4,959	524	2,728	1,067	1,280	2,645
Mixed Papers	1,902	2.7	149	359	511	108	362	152	102	159
Newspapers	2,875	4.1	139	592	685	59	448	39	97	816
Corrugated	7,899	11.3	339	611	2,334	303	1,574	735	607	1,397
Pulp Substitutes	2,494	3.5	420	368	664	45	331	140	296	230
High Grade Deinking	1,380	2.0	123	247	765	9	13	2	177	43
OTHER FIBERS	295	0.4	64	28	65	19	55	23	37	6
1986										
TOTAL FIBER	**74,297**	**100.0**	**5,353**	**5,215**	**11,442**	**1,480**	**18,332**	**10,018**	**11,142**	**11,315**
TOTAL WOOD PULP	56,203	75.6	4,053	2,906	6,187	920	15,283	8,859	9,729	8,265
Manufactured on-site	47,007	63.2	2,262	1,216	2,988	612	14,659	8,478	9,492	7,308
*Purchased & transferred	9,196	12.4	1,790	1,690	3,199	308	634	381	237	957
†TOTAL RECYCLABLE PAPER	17,796	24.0	1,234	2,283	5,188	541	2,991	1,135	1,376	3,047
Mixed Papers	2,001	2.7	158	375	522	109	383	160	101	192
Newspapers	3,079	4.2	149	621	736	61	470	41	104	897
Corrugated	8,556	11.5	366	648	2,434	316	1,715	758	649	1,670
Pulp Substitutes	2,653	3.6	435	391	707	45	385	161	301	228
High Grade Deinking	1,507	2.0	126	247	789	11	38	15	221	60
OTHER FIBERS	298	0.4	66	26	67	19	58	24	37	3
1987										
TOTAL FIBER	**77,309**	**100.0**	**5,604**	**5,358**	**11,904**	**1,505**	**19,243**	**10,377**	**11,820**	**11,498**
TOTAL WOOD PULP	58,304	75.4	4,234	2,970	6,439	928	15,924	9,151	10,258	8,399
Manufactured on-site	48,813	63.1	2,407	1,231	2,985	621	15,365	8,772	9,985	7,446
*Purchased & transferred	9,491	12.3	1,826	1,739	3,454	307	559	379	273	953
†TOTAL RECYCLABLE PAPER	18,683	24.2	1,291	2,361	5,398	559	3,262	1,193	1,525	3,094
Mixed Papers	2,048	2.7	162	389	536	112	392	161	102	193
Newspapers	3,184	4.1	156	650	781	59	483	42	114	900
Corrugated	9,050	11.7	380	651	2,534	325	1,914	805	739	1,702
Pulp Substitutes	2,790	3.6	467	420	723	53	417	164	313	233
High Grade Deinking	1,612	2.1	126	251	824	11	57	21	256	66
OTHER FIBERS	322	0.4	79	27	68	19	57	33	37	3
1988										
TOTAL FIBER	**79,510**	**100.0**	**5,800**	**5,517**	**12,184**	**1,555**	**19,761**	**10,716**	**12,306**	**11,664**
TOTAL WOOD PULP	59,850	75.2	4,357	3,011	6,604	961	16,277	9,438	10,665	8,537
Manufactured on-site	50,036	62.9	2,471	1,253	3,008	635	15,684	9,020	10,405	7,560
*Purchased & transferred	9,814	12.3	1,887	1,758	3,597	326	592	417	261	977
†TOTAL RECYCLABLE PAPER	19,311	24.3	1,367	2,477	5,510	575	3,425	1,240	1,591	3,124
Mixed Papers	2,119	2.7	167	419	548	113	405	168	105	193
Newspapers	3,255	4.1	168	674	788	60	499	43	121	903
Corrugated	9,328	11.7	385	703	2,585	338	1,997	826	781	1,712
Pulp Substitutes	2,907	3.7	485	431	758	54	437	178	319	244
High Grade Deinking	1,702	2.1	162	251	831	11	87	24	265	72
OTHER FIBERS	349	0.5	82	29	70	19	59	38	50	3

*Comprises all dried, wet lap or slush pulp not produced on-site including transfers from company owned or affiliated mills.
†Includes construction grades and molded pulp products.

fiber consumption in paper & paperboard manufacture (continued)

Thousands short tons

	Total U.S.	Percent of Total Fiber	New England	Mid-Atlantic	East-North Central	West-North Central	South Atlantic	East-South Central	West-South Central	Mountain & Pacific
1988										
TOTAL FIBER	**80,533**	**100.0**	**5,870**	**5,579**	**12,331**	**1,989**	**20,040**	**10,882**	**12,413**	**11,719**
TOTAL WOOD PULP	60,567	75.2	4,383	3,052	6,688	1,092	16,439	9,576	10,757	8,579
Manufactured on-site	50,485	62.7	2,481	1,264	3,027	657	15,815	9,142	10,496	7,602
*Purchased & transferred	10,082	12.5	1,902	1,788	3,661	435	624	434	261	978
†TOTAL RECYCLABLE PAPER	19,611	24.4	1,403	2,498	5,573	588	3,542	1,265	1,605	3,137
Mixed Papers	2,163	2.7	172	422	558	113	425	172	106	195
Newspapers	3,315	4.1	178	686	794	60	527	44	123	904
Corrugated	9,412	11.7	394	698	2,620	349	2,009	836	788	1,718
Pulp Substitutes	2,972	3.7	498	440	765	55	462	187	320	245
High Grade Deinking	1,749	2.2	162	251	836	11	120	26	268	76
OTHER FIBERS	355	0.4	84	29	70	19	59	41	51	3

Totals not adjusted for rounding differences.

pulpwood consumption in wood pulp manufacture

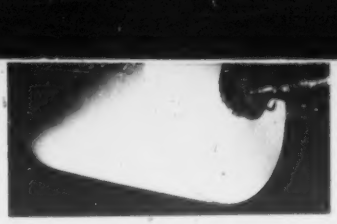
Thousands of CORDS

1985										
TOTAL PULPWOOD	**82,134**	**100.0**	**5,132**	**2,027**	**4,356**	**943**	**28,396**	**15,156**	**13,660**	**14,464**
Roundwood & Roundwood Chips	49,037	59.7	3,930	1,722	3,233	854	17,823	10,716	8,528	2,232
Forest Residues	3,773	4.6	—	59	442	26	1,061	304	1,188	693
Manufacturing Residues	29,325	35.7	1,202	247	681	63	7,513	4,136	3,944	11,539
1986										
TOTAL PULPWOOD	**87,469**	**100.0**	**5,357**	**2,094**	**5,010**	**965**	**27,729**	**16,076**	**14,791**	**15,444**
Roundwood & Roundwood Chips	52,894	60.4	4,158	1,783	3,809	873	18,966	11,437	9,448	2,419
Forest Residues	4,075	4.7	—	60	464	38	1,164	313	1,267	770
Manufacturing Residues	30,500	34.9	1,199	251	737	54	7,600	4,328	4,076	12,254
1987										
TOTAL PULPWOOD	**89,421**	**100.0**	**5,367**	**2,145**	**5,090**	**975**	**28,772**	**16,420**	**14,916**	**15,735**
Roundwood & Roundwood Chips	53,877	60.2	4,112	1,829	3,851	878	19,498	11,608	9,541	2,559
Forest Residues	4,192	4.7	—	61	502	38	1,238	308	1,241	804
Manufacturing Residues	31,352	35.1	1,254	255	737	59	8,037	4,505	4,134	12,371
1988										
TOTAL PULPWOOD	**91,264**	**100.0**	**5,400**	**2,182**	**5,095**	**1,065**	**29,297**	**16,904**	**15,304**	**16,016**
Roundwood & Roundwood Chips	55,004	60.3	4,162	1,865	3,825	956	19,845	11,894	9,824	2,634
Forest Residues	4,281	4.7	—	62	527	50	1,232	335	1,274	802
Manufacturing Residues	31,978	35.0	1,239	256	744	59	8,221	4,675	4,206	12,580
1989										
TOTAL PULPWOOD	**92,080**	**100.0**	**5,400**	**2,222**	**5,122**	**1,158**	**29,493**	**17,165**	**15,389**	**16,133**
Roundwood & Roundwood Chips	55,463	60.2	4,156	1,904	3,765	1,036	19,992	12,019	9,898	2,693
Forest Residues	4,410	4.8	—	62	612	63	1,263	336	1,274	801
Manufacturing Residues	32,207	35.0	1,243	256	745	59	8,238	4,809	4,217	12,638

Totals not adjusted for rounding differences.

FIBER CONSUMPTION DEFINITIONS

1985—Actual consumption
1986—Best estimate based on year-to-date experience
1987-1989—Consumption at capacity levels of production



recyclable paper consumed in paper & paperboard manufacture

actual consumption

Thousands short tons

END PRODUCTS	1985 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	**16,550**	**1,902**	**2,875**	**7,899**	**2,494**	**1,380**
TOTAL PAPER	4,645	82	1,499	309	1,505	1,251
NEWSPRINT	1,315	—	1,312	—	3	—
PRINTING, WRITING & RELATED	1,019	—	—	14	702	304
PACKAGING & IND. CONVERTING	262	10	5	95	146	5
TISSUE	2,049	72	182	200	654	942
TOTAL PAPERBOARD	11,905	1,820	1,376	7,590	989	129
KRAFT, BLEACHED & UNBLEACHED	1,266	—	—	1,150	106	9
SEMICHEMICAL	1,655	11	9	1,578	57	—
RECYCLED	8,083	1,404	1,155	4,640	764	120
CONSTRUCTION PAPER & BOARD	901	405	212	222	62	—

Data on recyclable paper are collected in an industry-wide survey of paper and paperboard mills under the following definitions:
1985 — Actual consumption
1986 — Best estimate based on year-to-date experience
1987-1989 — Consumption at capacity levels of production

planned future consumption

Thousands short tons

END PRODUCTS	1986 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking	1987 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	**17,796**	**2,001**	**3,079**	**8,556**	**2,653**	**1,507**	**18,683**	**2,048**	**3,184**	**9,050**	**2,790**	**1,612**
TOTAL PAPER	4,913	97	1,603	314	1,580	1,319	5,156	98	1,658	302	1,695	1,404
NEWSPRINT	1,399	—	1,399	—	—	—	1,429	—	1,429	—	—	—
PRINTING, WRITING & RELATED	1,060	—	—	14	729	317	1,147	—	—	14	790	343
PACKAGING & IND. CONVERTING	269	10	5	92	156	5	261	10	5	80	160	6
TISSUE	2,185	87	199	209	694	996	2,319	87	224	208	745	1,055
TOTAL PAPERBOARD	12,883	1,904	1,476	8,242	1,073	188	13,526	1,950	1,525	8,748	1,095	208
KRAFT, BLEACHED & UNBLEACHED	1,552	—	—	1,329	168	55	1,781	—	—	1,541	168	71
SEMICHEMICAL	1,720	12	9	1,642	57	—	1,808	12	9	1,732	55	—
RECYCLED	8,682	1,482	1,243	5,041	783	133	8,995	1,524	1,283	5,245	805	137
CONSTRUCTION PAPER & BOARD	929	410	224	230	65	—	942	414	233	229	66	—

END PRODUCTS	1988 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking	1989 Total	Mixed Papers	Newspapers	Corrugated	Pulp Substitutes	High Grade Deinking
TOTAL ALL GRADES	**19,311**	**2,119**	**3,255**	**9,328**	**2,907**	**1,702**	**19,611**	**2,163**	**3,315**	**9,412**	**2,972**	**1,749**
TOTAL PAPER	5,336	102	1,671	314	1,760	1,489	5,452	101	1,699	321	1,798	1,534
NEWSPRINT	1,431	—	1,430	—	1	—	1,444	—	1,443	—	1	—
PRINTING, WRITING & RELATED	1,168	—	—	14	792	362	1,180	—	—	14	796	369
PACKAGING & IND. CONVERTING	277	12	5	89	165	5	279	12	5	89	168	5
TISSUE	2,460	90	236	211	801	1,121	2,550	90	250	218	833	1,160
TOTAL PAPERBOARD	13,975	2,017	1,584	9,014	1,147	213	14,159	2,062	1,616	9,091	1,174	215
KRAFT, BLEACHED & UNBLEACHED	1,812	—	—	1,570	168	74	1,824	—	—	1,579	168	76
SEMICHEMICAL	1,847	12	10	1,765	60	—	1,864	13	10	1,781	60	—
RECYCLED	9,315	1,568	1,329	5,434	845	139	9,466	1,611	1,359	5,486	871	139
CONSTRUCTION PAPER & BOARD	1,001	437	245	245	74	—	1,005	438	247	245	75	—

Totals not adjusted for rounding differences

Recyclable paper for molded pulp included under Construction Paper & Board as follows: 1985, 179,000 tons; 1986, 191,000 tons; 1987-89, 202,000 tons

announced capacity expansion new mills and machines

projects included in survey estimates

Thousands short tons

Grade	Annual Capacity	Proposed Start-up	Company & Location
Coated Groundwood	200	1986	Bowater Incorporated Catawba, SC
Coated Groundwood	180	1987	Consolidated Papers Incorporated Wisconsin Rapids, WI
Coated Groundwood	200*	1988	Blandin Paper Company Grand Rapids, MN
Coated Free Sheet	N.A.	1988	Potlatch Corporation Cloquet, MN
Coated Free Sheet	215	1986	Scott Paper Company Skowhegan, ME
Uncoated Groundwood	230†	1988	Lake Superior Paper Industries Duluth, MN
Uncoated Free Sheet	100	1985	Georgia-Pacific Corporation Crossett, AR
Uncoated Free Sheet	230	1986	Georgia-Pacific Corporation Port Hudson, LA
Uncoated Free Sheet	185	1986	Hammermill Paper Company Selma, AL
Uncoated Free Sheet	250-300	1985-1986	International Paper Company Mobile, AL
Uncoated Free Sheet/Cotton Fiber	30*	1986	Kimberly-Clark Corporation Whiting, WI
Tissue	N.A.	1985	Fort Howard Paper Company Muskogee, OK
Tissue	N.A.†	1987 & 1988	Fort Howard Paper Company Rincon, GA
Tissue	70	1986	James River Corporation Naheola, AL
Unbleached Kraft Linerboard	315*	1985	Chesapeake Corporation West Point, VA
Solid Bleached Paperboard	250*	1986	Westvaco Corporation Covington, VA
Recycled Paperboard	175†	1985	Temple-Inland Incorporated Ontario, CA
Bleached Sulfate Pulp	265†	1985	Champion International Corporation Quinnesec, MI

** Will replace unspecified existing capacity. N.A.—Not Available. † New mill.*

Expansion projects include new paper, paperboard and wood pulp mills and new paper and paperboard machines in existing mills. These projects have been publicly announced by the managements of the companies concerned and are included in the capacity estimates reported in this survey. Estimates also include confirmed expansion projects that have not been publicly announced which, in keeping with the confidential nature of the survey, are not included in this listing.

definitions and grade descriptions

Practical Maximum Capacity: Practical Maximum Capacity, as defined in this survey, is the tonnage of paper, paperboard or pulp of normal commercial quality that could be produced with full use of equipment and adequate supplies of raw materials and labor, and assuming full demand. No allowance is made for losses due to unscheduled shutdowns, strikes, temporary lack of power, etc., which cause decreases in actual production, but not in productive capacity. Capacity of paper machines which produce more than one grade is apportioned in accordance with actual production patterns or plans for future operation.

Capacity is reported in short tons of net finished paper and paperboard and air-dry (10% moisture content) pulp. Shrinkage of bleached or semibleached pulp is taken into account.

Annual practical maximum capacity—includes changes in capacity only for the portion of the year in which they are actually effective.

Year-end practical maximum capacity—assumes that all changes in capacity are in effect from the first day of the year in which they occur.

New Machines and Net Improvements: Capacity increases or decreases are shown in two main groups: New Machines and Net Improvements.

New Machines—are defined as machines purchased or to be purchased from equipment manufacturers. Consequently, capacity changes resulting from transfers of paper machines from one mill to another are shown under Net Improvements.

Net Improvements—are defined as net changes resulting from modernization of machines, dismantling old machines, shifts in grades, etc.

Capacity increases from new machines are shown under New Machines for the first two years of operation (including the year of installation). Any additional capacity realized in a third or subsequent year is shown under Net Improvements.

Market Pulp Capacity: Market pulp in this survey is defined as wood pulp produced in the U.S. for sale to pulp consumers. It excludes pulp for use or consumption by a producing mill or for shipment by a producing mill to other mills within its supply region which it owns, controls or with which it is affiliated. Shipments to owned mills outside the U.S. are defined as market pulp.

PAPER GRADES

Newsprint: Paper used chiefly in the printing of newspapers, made largely from mechanical pulp and weighing not less than 28½ pounds nor more than 35 pounds (24 × 36 – 500).

Uncoated Groundwood: Uncoated papers containing more than 10% groundwood or other mechanical pulps in their furnish, excluding newsprint.

Machine and Off Machine Coated: Bleached papers with a coating weight of at least 2½ pounds (25 × 38 – 500) on either side and at least 50% of the coating consisting of clay (Kaolin).

Coated Groundwood: Coated papers containing more than 10% mechanical pulp (mostly stone groundwood and/or refiner) in their furnish.

Coated Free Sheet: Coated papers containing 10% or less mechanical pulp (mostly stone groundwood and/or refiner in their furnish).

Uncoated Free Sheet: Bleached uncoated printing and writing papers containing not more than 10% groundwood or other mechanical pulps in their furnish; i.e., offset, tablet, envelope, business papers (bond, ledger, mimeo, duplicator) form bond, cover and text and related papers.

Bleached Bristols: Includes tabulating index, tag and file folder, coated cover bristols, and uncoated bristols (index, printing, and postcard).

Cotton Fiber: Papers containing 25% or more in their furnish of cotton, cotton rags, cotton waste, linters, linter pulp, flax, or similar fibers.

Thin Papers: Includes carbonizing, condenser, cigarette, bible, and similar papers.

Packaging and Industrial Converting: Wrapping paper, shipping sack, bag and sack other than shipping sack, and other converting papers—18 pounds and over.

Unbleached Kraft: Paper containing more than 80% unbleached sulfate wood pulp. Wrapping paper, shipping sack, grocers sack and other bag, and other converting papers—18 lbs. and over (24 × 36 – 500).

Bleached Packaging and Industrial Converting: Paper made for similar end uses as unbleached kraft, but made from bleached, and semibleached sulfate and unbleached sulfite pulps. Wrapping paper, shipping sack, grocers and other bag and sack, and other converting papers—18 lbs. and over (24 × 36 – 500).

Specialty Packaging: Paper and board of all weights and furnishes, usually used as protective packaging for food and other consumer products, such as bakery bags, fast food and frozen food wraps. Also includes glassine, greaseproof and vegetable parchment paper.

Special Industrial: Paper and board, of all weights, calipers and furnishes, designed for specialized end uses and manufactured to exact customer specifications; includes abrasive paper, electrical insulation, filter paper and similar grades. Does not include wet machine board.

Tissue: Includes sanitary grades: i.e., toilet, facial, napkin, toweling, sanitary napkin, wiper and special sanitary papers, and waxing, wrapping, wadding and miscellaneous grades.

PAPERBOARD GRADES

Unbleached Kraft Paperboard: Paperboard made from a furnish containing not less than 80% wood pulp produced by the kraft sulfate process.

Linerboard: Unbleached kraft paperboard manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes. Includes solid unbleached kraft linerboard, both Fourdrinier and Cylinder, mottled white linerboard and clay coated unbleached kraft linerboard.

Folding: Paperboard manufactured, such as clay coated unbleached kraft and bleached lined unbleached kraft backed, for conversion into folding cartons and beverage carriers.

Other: All unbleached kraft paperboard whose end use is not otherwise classified, such as board for a filler for solid fiber board to be fabricated into a shipping container, tube, can, drum, file folder, tag, automotive panel, etc.

Solid Bleached Packaging Paperboard: Paperboard made for use in packaging from a furnish containing not less than 80% virgin bleached wood pulp. Bleached bristols not manufactured for packaging are included in the proper bleached bristol classification under papers.

Linerboard: Solid bleached paperboard, either Fourdrinier or Cylinder, manufactured for use as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Folding: Solid bleached paperboard for conversion into folding cartons, such as folding cartons for ice cream, butter, oleomargarine, frozen foods, bakery products, cosmetics, drugs, etc.

Milk Carton and Food Service: Solid bleached paperboard for conversion into milk carton, heavyweight cup, and round nested food container, plate, dish and tray, and for packaging for moist, liquid and oily foods.

Other: Solid bleached paperboard for conversion into packaging of blister pack, tubes and other products not classified above and for industrial products not classified under bleached bristols.

Semichemical Paperboard: Paperboard made from a furnish containing not

less than 75% virgin wood pulp, the predominant portion of which is produced by a semichemical process.

Recycled Paperboard: Paperboard manufactured from a combination of recycled fibers from various grades of paper stock with the predominant portion of its furnish being recycled fibers: sometimes including a very minor portion of virgin fibers.

Linerboard: Recycled paperboard produced from a furnish containing less than 80% virgin kraft wood pulp and used as facing material when combining paperboard for conversion into corrugated or solid fiber boxes.

Corrugating Medium: Recycled paperboard produced from a furnish containing less than 75% virgin wood pulp and used as the fluting material when combining paperboard for conversion into corrugated boxes.

Container Chip and Filler Board: Recycled paperboard manufactured as a filler for solid fiber board for conversion into solid fiber boxes and other container chipboard (all chipboard under 26 pounds per 1000 sq. ft. manufactured for use as facing corrugated, solid fiber and single faced products which are used for interior packing, e.g., pads, partitions, dividers, layers and cushioning).

Folding: Recycled paperboard manufactured with bending quality for conversion into folding cartons (including unlined chipboard, kraft lined, white lined and clay coated).

Set-up: Recycled paperboard manufactured with non-bending specifications for conversion into rigid or set-up boxes (including plain chipboard, newslined, white vat lined).

Gypsum Wallboard Facing: Recycled paperboard manufactured for use as liner or facing on gypsum board, plasterboard (includes white, cream, gray, blue and all colors).

Other: Recycled paperboard with the same characteristics as paperboard for bending packaging or non-bending packaging but for non-packaging uses; plus recycled paperboard for end uses not otherwise classified, such as tag, file folder, tube, can, drum, match stem, tablet backs, toys, etc.

CONSTRUCTION PAPER & BOARD & OTHER

Construction Paper: Sheathing paper, felts (roofing felts, floor covering, automotive felts, deadening, industrial, pipe covering, refrigerator), asbestos paper and asbestos filled paper, flexible wood fiber insulation.

Wet Machine Board: Binders board, shoe board (e.g., counter board, heel board, innersole, etc.) automotive board, chair seat backing, coaster board, luggage, mill board, panel board, table top board, etc.

Insulating Board: A fibrous-felted homogenous panel made by interfelting of the fibers (e.g.,interior building board, wallboard, sound deadening board, acoustical tile, exterior sheathing board, roof insulation board, trailer board, etc.).

WOOD PULP

Dissolving & Special Alpha: Highly refined bleached white sulfite or sulfate pulp with a high content of alpha (pure cellulose) fiber.

Sulfite Paper Grades: Paper grade pulps produced by the sulfite process. Bleached pulp must achieve a G.E. Brightness of more than 75.

Sulfate & Soda Paper Grades: Paper grade pulps produced by the sulfate or soda process. Bleached pulp must achieve a G.E. Brightness of more than 75. Semibleached pulp must achieve a G.E. Brightness of not less than 45 or more than 75.

Semichemical: High yield pulps produced with the use of some chemical agent such as neutral sulfite (N.S.S.C.); alkaline cook; chemipulp (defibrated pulp put through reaction chambers); chemi-mechanical pulp with a yield usually above 60%.

Mechanical: Fine textured, usually bright pulps, used in paper and paperboard manufacture and produced by mechanical rather than chemical processes.

Stone Groundwood: Pulp produced by grinding wood logs or bolts (usually 4 ft. in length) into relatively short fibers.

Refiner: Pulp produced by subjecting wood chips and/or residues to atmospheric or open discharge refining.

Thermomechanical: A high-yield pulp produced by a thermomechanical process in which wood particles are softened by pre-heating under pressure prior to a pressurized primary refining stage. Usually replaces or reduces the chemical pulp component in newsprint or groundwood papers.

WOOD PULP FOR CONSTRUCTION PAPER & PAPERBOARD

Coarse, often brown, pulps used in the manufacture of insulating board and construction paper. Also includes similar pulps if used in the manufacture of wet machine board. Excludes pulp for hard pressed board.

Stone Groundwood and Refiner: Pulps produced by the stone groundwood or refiner processes but used in the manufacture of construction paper and board.

Defibrated/Exploded: Pulps produced by subjecting wood chips to preheating and pressurized refining. Similar to the thermomechanical process except that operating variables produce an economical, coarse brown pulp suitable only for construction paper and board.

Screenings: Rejects and off-quality screenings from all grades of wood pulp except dissolving.

FIBERS

Roundwood: Comprises roundwood bolts and logs (4 feet or longer, including tree lengths) brought to the pulpmill for chipping, or chips made from primary roundwood bolts and logs at a chipmill, remote from the pulpmill.

Forest Residues: All logging residues such as portions of bolts or logs less than the minimum diameter specified by the consuming mill and poles, saplings, slash, limbs, twigs, or portions of bolts or logs not regarded as merchantable in normal pulpwood or sawlog operations. May also include merchantable portions of trees that will not be used for higher value products. Chips made from forest residues.

Manufacturing Residues: All mill residues such as slabs, edgings, trimmings, cores, planer shavings, sawdust or other wood residues of a wood manufacturing process and chips made from these residues.

Other Fibers: Cotton linters, cotton linter pulp, textile mill waste and cuttings, rags, waste rope and cordage, bagasse, flax, straw, jute, esparto, kenaf and all other vegetable fibers used in paper and paperboard manufacture.

RECYCLABLE PAPER

Mixed Papers: Number 1 and 2 mixed papers, super mixed papers, boxboard cuttings, mill wrappers.

Newspapers: Number 1 news, overissue news, super news. Any grade to be used as a news substitute.

Corrugated: Old containers both corrugated and solid fiber, container plant cuttings.

Pulp Substitutes & High Grade Deinking: Includes ledger, tabulating cards, bleached sulfate shavings (unless used as a news substitute). Envelope and bleached sulfite and sulfate cuttings, coated book stock, news and publication blanks, kraft paper and bags and all other grades not classified above.

Print free grades are reported as *Pulp Substitutes* and printed grades, if deinked, are reported as *High Grade Deinking*.